

FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS:

	PAGE
Editorial Comment :	
The Technical Report ...	1041
Men of Moment in the World of Flight: Dr. R. T. Glazebrook, C.B., F.R.S., the Director of the National Physical Laboratory ...	1043
What Night Flying Feels Like. By Sydney Pickles ...	1046
The Military Wing, Royal Flying Corps ...	1046
Second Illuminated Night Flying and Firework Display, Hendon ...	1047
The Blackburn School Monoplane ...	1048
Royal Aero Club. Official Notices ...	1052
The Paris Aero Salon ...	1053
From the British Flying Grounds ...	1058
Foreign Aviation News ...	1064
Models. Edited by V. E. Johnson, M.A. ...	1065
Hydro-Aeroplanes at Monaco ...	1066
Correspondence ...	1067

EDITORIAL COMMENT.

The Technical Report.

No doubt, to the dilettante, the Technical Report of the Advisory Committee for Aeronautics may seem heavy reading; but to the student, there is nothing better worthy of the expenditure of time and mind. It contains the cream of the technical research for the past year, and that research, as conducted under the ægis of the Advisory Committee, both at the N.P.L. and at the R.A.F., is second to none in the world.

Much of it must, of course, be read with discretion, and some of it is perhaps hardly conducive to a furtherance of the knowledge of the "practical man" in its present form. On the other hand, even the "rule of thumb" constructors can scarcely find fault with the simple language and directness of statement throughout the covering letter under which the Report is addressed as follows: "To the Right Honourable H. H. Asquith, M.P., First Lord of the Treasury—Sir," and subsequently proceeds in some thirty pages of text to provide a succinct synopsis of the result of the year's work before it is finally signed on behalf of the Committee by Lord Rayleigh, its President.

With this letter and the facts it contains we purpose

dealing exclusively for the moment, and indeed we could wish for nothing better than that space permitted us to let Lord Rayleigh write the leading article for this issue, for there is no clearer way of explaining what the experiments have led to than has been adopted in the President's introduction to his committee's report. The full text of this and other useful material, however, must abide its time for available space in other parts of less crowded issues of FLIGHT. The Paris Show and the Technical Report are more than we can manage at once, even with the most liberal extensions.

Some of the most interesting work discussed in the Report was that made under the direction of Mr. Mervyn O'Gorman at the R.A.F. at Farnborough. In order to check experiments on dirigible shapes, which had been conducted under water on small scale models at the N.P.L., large models, 18 ft. in length, were towed down a tramway by a falling weight. By a law known as "dynamical similarity," enunciated by Lord Rayleigh in the Report for 1909-10, it is possible to convert results of experiments made in water into data for similar larger objects moving in the air and *vice versa*, and Mr. Bairstow, of the N.P.L., who has been engaged a good deal on this sort of calculation, has worked out as an example from such small scale experiments that a 40-ft. diameter dirigible envelope of specified form and 6:1 fineness ratio experiences a resistance of 320 lbs. at 40 m.p.h.

To the majority of FLIGHT readers, dirigible experiments are of less concern than those relating to aeroplanes, but we consider that it is of the greatest importance to keep the dirigible in sight; notwithstanding that it is for the moment in the shade of the aeroplane's popularity. It is, at any rate, of the utmost concern to know everything possible about resistance in the air, and if dirigible experiments help towards that end, as they do, then no one has cause to grumble that the main subject was airships. Many bye-products, even of commerce, are regarded as having the greater value.

Much interesting work has also been accomplished on aeroplanes, however, and it will be admitted that the points tackled are such as concern the matters uppermost in everyone's mind. Wing cambers have been treated in a most interesting way, for instance, and the research has led to the conclusion that the upper and lower surfaces ought to be regarded separately and designed independently. The top surface is by far the more important for ordinary flight angles, and at "inclinations from 5° to 10° the negative pressure on the convex surface is a maximum, and reaches a very high value at

a point immediately behind the leading edge of the plane." The same fact, readers will remember, was shown graphically in the diagrams reproduced in FLIGHT some time ago from M. Eiffel's book. There appears, however, to be some little divergence of conclusions between the N.P.L. and Eiffel in respect to various similar tests, which is indicative of the extreme difficulty of establishing experimental testing apparatus in such a way as shall be entirely free from error. It is their preliminary work of this kind that has for so long occupied the staff of the N.P.L., and has prevented them from making earlier progress with these useful tests. What care and skill can do is done at Teddington, and what is published by the sanction of the N.P.L. is as near fact as anyone is likely to arrive in our present age.

A loss of lift results from making the lower face of a cambered wing flat, but the ratio of lift to drift is not impaired over the useful range of angles from 7 degrees to 12 degrees, inclination. The loss of lift is such as to make necessary an increase of area of about 14 per cent. The maximum ratio of lift to drift for a cambered wing, as formed experimentally, is 13.5 according to the N.P.L. By Eiffel's experiments it was over 14.

Those who have studied aeroplane design are aware that the spacing of the plane of a biplane, such that the "gap" between them is equal to the chord, originated from early research of the Wrights in America. This empirical dimension now receives support in respect to machines designed for speeds between 40 and 60 m.p.h., but actually it would appear that even when the gap is as much as 1.6 times the chord the loss of lift is in the order of 10 per cent. For a gap equal to the chord the loss is about 17 per cent. Constructional considerations, of course, interfere with the use of a very large gap.

The effect of staggering the planes so that the lower plane is set back 0.4 of the gap, is to improve the lift about 5 per cent. and also to afford some constructional advantages and also the benefit of a clearer range of vision. "The resistance of struts set obliquely is also somewhat less than when they are at right angles to the direction of motion." It will be remembered that the BE 3 type biplanes of the R.A.F. have staggered planes, which is one of the principal differences between that model and BE 2. Goupy, in France, was one of the earliest, if we remember correctly, to build aeroplanes with staggered planes. It is particularly interesting to observe the above remark about the struts being decreased in resistance when inclined to the stream; the cause, presumably, is the virtual increase in their fineness ratio (length to breadth of section) when the strut is cut, so to speak, on the slant.

In respect to dihedral angle, the Report states that "any advantage in lateral stability that may be obtainable by dihedral angle between the wings can be gained without any loss of lift or increase in head resistance," which must be distinctly comforting to those who advocate the system. It is an affirmation of what we might describe as the "passive" type, for it does not say anything about the justification for assuming that the merit of stability is inherent in the dihedral arrangement. This, however, is, of course, quite outside the immediate research of the N.P.L. at present.

Reverting for a moment to the question of struts, there is a note of some importance in the Report in which mention is made of a calculation from which it evolved that a gain in effective lift of 79 lbs. would result from replacing all the struts in the machine with others of better stream-line form. It is sometimes forgotten that

every pound resistance saved on head resistance means six pounds extra lift, or even more, on a well designed machine, so even small improvements are worth while where they undergo this automatic magnification without extra trouble on the designer's part.

Continuing his work on skin friction in pipes, Dr. Stanton has established that the resistance of an artificially roughened surface varies as a power higher than the square of the velocity, but for the rest the experiments are not yet finished.

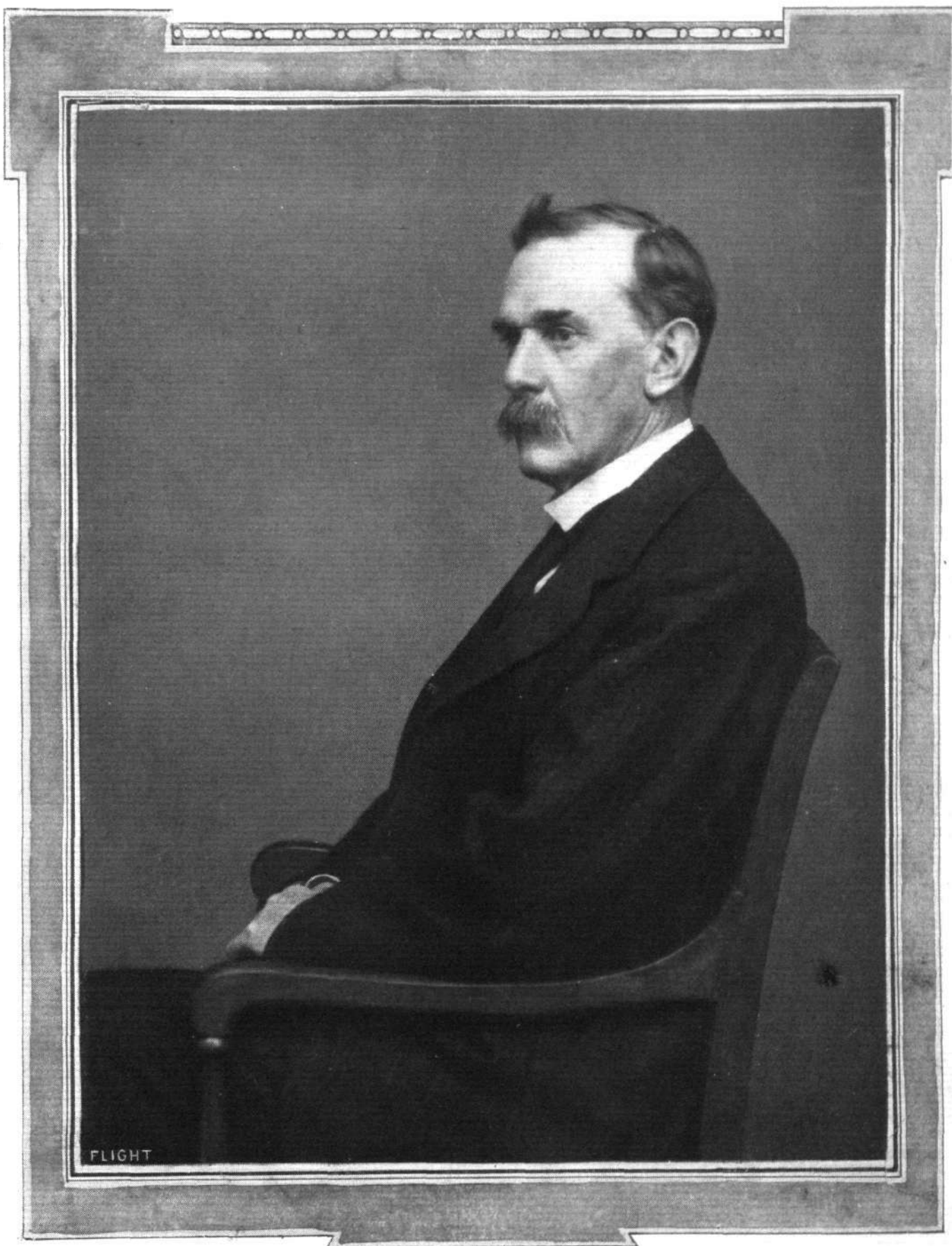
An extensive section of the Report is occupied by a series of experiments carried out on a Vickers propeller by varying the blade area. As the change appears to have been made by cutting away the edges without appreciably adjusting the section as a whole, the edge effect would seem to us to be likely to render the results of small general application. This, of course, raises the whole question of tests that are useful and not useful, which may be said to be the very foundation of the Advisory Committee's existence. There is no more difficult thing to determine in practical science than how to arrive at the answer to a general question. The first thing necessary is to express that question in a series of specific problems for which it may be possible to devise exact tests, and in this the would-be experimenter must be a little nearer the mark than the optimistic seeker after the truth who wrote and asked the N.P.L. if they would conduct "a complete investigation into the question of stability for five pounds sterling."

Moreover, the difficulty in properly conducting a *line* of research is much complicated by the temporary pre-eminence of a particular problem which demands immediate solution. Tests that are *superficially* suitable are apt to be rushed through in order to provide the information required and so satisfy the insistent questioner, but when in due course the real answer evolves from the natural progress of well-organised research, it is all too likely to happen that the applicant for advance knowledge has quite unwillingly, of course, been placed in a fool's paradise.

People who cannot realise the bearing of one experiment on another, and who cannot understand that the proper answer often comes by circuitous routes when the *apparently* direct question elicits little more than a half truth, cannot, of necessity, appreciate the significance of the Advisory Committee. The reason why men of the stamp of Lord Rayleigh and Dr. Glazebrook, and various other F.R.S.'s who have never qualified for their pilot's certificates are engaged on the work of advising the Prime Minister on aeronautics, is because it requires men of the particular kind of scientific *experience* that they possess to ensure that the Nation's money is not wasted in the independent carrying out of a lot of disconnected tests that may have every semblance of importance yet may be entirely misleading all the same. There is no work in the world more difficult or requiring more real active patience of mind than the origination and superintendence of pioneer research, and for our own part we have the highest respect for the efforts of those working in this field for British aeronautics. The progress is exasperatingly slow, of course, but not even unlimited funds can always hasten such work, although the more men employed simultaneously, the more subjects can be tackled, provided always that the beginning of one experiment is not dependent on the ending of another, as is so often the case.

Just now, when the subject of wings bursting in mid air is one of those well to the fore, it is interesting to learn

MEN OF MOMENT IN THE WORLD OF FLIGHT.



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The Director of the National Physical Laboratory.—Dr. R. T. GLAZEBROOK, C.B., F.R.S.

from the Report that an investigation into aeroplane fabrics is in progress. Here is a case in point where the precise nature of the tests required is very difficult to specify. Everyone knows *in general* what is wanted, of course, but let anyone who doubts the difficulty sit down and devise just the sort of test that could be made in a laboratory and would give the required answer in the way desired. As the N.P.L. have conducted a very exhaustive research into the qualities of balloon fabrics under various conditions, this experience will probably be of very great value to them in their present research.



Aviation Lectures.

THE Department of Applied Science, University of Sheffield, has arranged a special course of four lectures to be given by Mr. L. Bein Desbleds, Lecturer in Aeronautical Engineering at the Polytechnic, London. The lectures will commence on Friday, November 22nd, at 7.30 p.m., and continue on the three succeeding Fridays. The fee for the course is 5/-, and all details can

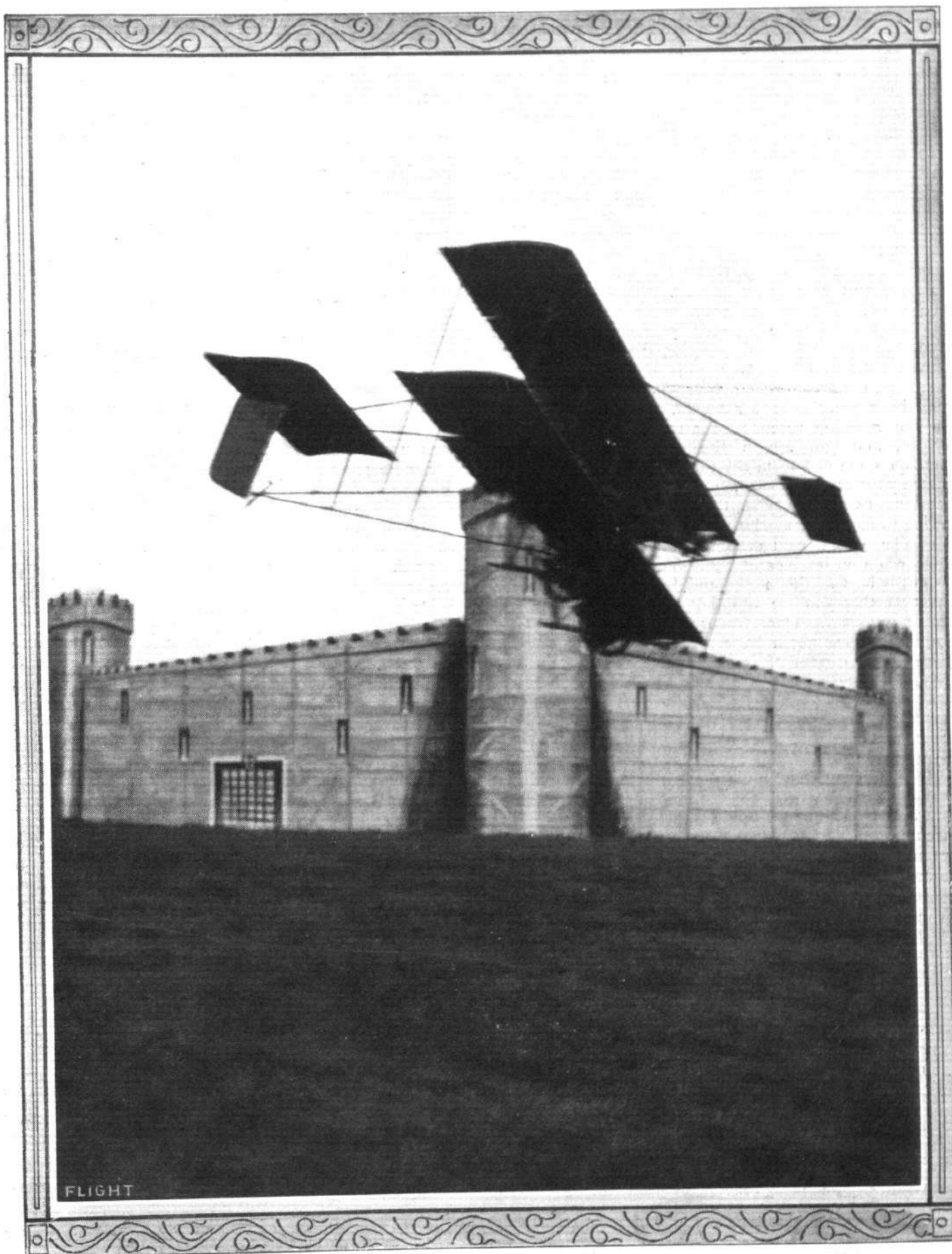
A chapter that will be read with interest by everyone is that on "Experiments with full-scale flying machines," written by Mr. Mervyn O'Gorman, the Superintendent of the R.A.F. It contains a general *resumé* of the work that has evolved those very successful biplanes BE 2 and BE 3. It is quite impossible, of course, to deal adequately with the contents of this three hundred page volume in a single article, but we have said sufficient, we trust, to convince every reader of FLIGHT that it is something every student of the subject ought not only to possess but to *read*.

be obtained from Mr. W. Swift, the Secretary of the University. The subjects of the lectures are:—

Lecture I, Nov. 22nd ...	"The Present Stage of Aviation."
Lecture II, Nov. 29th ...	"The Sustentation of Aeroplanes."
Lecture III, Dec. 6th ...	"The Propulsion of Aeroplanes."
Lecture IV, Dec. 13th ...	"The Evolution and Construction of Aeroplanes."



Mr. Dyott, who has been doing much good Flying Work in America, piloting one of the small Deperdussins.—A remarkable sunset picture secured at Rheims last year.



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Mr. R. T. Gates, on the Grahame-White biplane, flying adjacent to the "fort," which was one of the features of the demonstration on Saturday at the Hendon aerodrome.

WHAT NIGHT FLYING FEELS LIKE.

By SYDNEY PICKLES.

[SEEING how interesting to the general public have proved the night flying exhibitions at Hendon, FLIGHT has endeavoured to obtain an idea of what it feels like to fly by night. To Mr. Sydney Pickles, chief instructor of the Ewen School at Hendon, who made such admirable flights last Saturday at Hendon on his Caudron biplane, we are indebted for the following: his impressions of flying after nightfall.—ED.]

Is there any special difficulty? Broadly speaking, I should say no. The great difference between flying by day and flying by night is, that in the latter case one has to fly almost entirely by instinct. Take, for instance, the get-off. You arrange your machine so that you get a clear run over the ground; your engine is started, and you speed forward, steering direct for, we will say, a light in the distance. Instinct soon tells you when you have reached your flying-speed, and you pull back your lever for ascent. The vibration due to the machine running over rough ground suddenly ceases, and you are in the air. As for climbing, perhaps some people might think that, being unable to gauge your rate of ascent, from noticing the ground or land marks around you, there would be a danger of trying to force the machine up too great an angle and so losing speed, with probably disastrous results. But here again instinct comes in. You can always judge from the beat of the motor and the feel of the control lever whether you are adopting the most advantageous angle for ascent. Once you are up and well clear of the ground nothing much happens, and the only thing you have to be careful of is to so steer your course that should the engine stop you would be able to plane down and land on a clear piece of ground. Here I must say that it is essential to be thoroughly familiar with your machine and the ground over which you are flying.

One curious thing I noticed when flying high, and that was the tendency of unconsciously allowing the machine to drop to a lower altitude. Flying in daytime one occupies one's time in looking all round, not only at the ground below but towards the horizon. This must unconsciously help one in keeping one's altitude. Flying in darkness, the lights of the illuminated aerodrome below attract most of your attention as far as exterior objects are concerned, and, constantly looking down, there is this tendency to allow your machine

to lose altitude. Besides this, it is difficult at first, in darkness, to judge your height from the appearance of lights on the ground. You think you are at 500 ft. when you are only in reality 100 ft. from the ground. In this respect it is very much like the delusion you suffer when you are learning to fly, and you climb for the first time to about 100 ft. You come down thoroughly pleased with yourself, thinking you have surprised the boys by going up to about a thousand, that is if you have not beaten the world's altitude record. There may be danger in this, and I certainly advise anyone who intends going up after dark to carry an altimeter and have it illuminated.

As regards the illumination of your altimeter and your other instruments, the light should be kept low down and well shaded, to do away with the constant glare on the eyes that would render vision of what is ahead and below you difficult. You will perhaps have noticed that on a large boat all lights in front of the man at the wheel are kept well shaded so that his eyes may be able all the more readily to detect any objects in the darkness ahead. It is exactly the same on an aeroplane. Personally I found that flying my Caudron biplane illuminated with electric lights arranged along the leading edges of the planes was not so comfortable as I should have desired. Further, on the machine I flew last Saturday the propeller is painted red, and as it is in front of the lights it showed up to me, while flying, as a large misty red disc.

Landing is perhaps the operation over which the greatest amount of care has to be taken when flying at night time. I found the best method was to *vol plane* down until about 50 feet off the ground, and then gradually approach *terra firma* by switching on and off alternately. As soon as you catch a glimpse of the ground you must flatten out immediately, for whereas you think you are perhaps 20 feet up, you are in reality only about six. Then you gradually lower the machine down till the wheels touch.

Is there much danger? Here again I would say no, providing that you do not attempt to fly in anything but practically a dead calm, that you do not attempt any fancy tricks, that you keep well within the confines of the aerodrome, and that you remain constantly on the alert, confident that, should your engine stop, you could land on clear ground.

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THE MILITARY WING, ROYAL FLYING CORPS.

Outline of Proposals for the Formation of a Special Reserve.

THE following are the draft proposals for the formation of a Special Reserve of the Military Wing of the Royal Flying Corps. These have not yet been approved and may be materially amended in detail.

The Special Reserve is mainly required to complete the Airship and Kite Squadron, and the Flying Depot on mobilization,

The men will, therefore, require to be trained in—

- (i.) The drill of the ground detachments of airships and kites.
- (ii.) The application of their trades in preparing and maintaining aircraft in the field.

Selected men will, however, be trained in aeroplane work.

The period of annual training will probably be the same as that for the Territorial Force, the recruit doing his recruit drills during his first annual training.

In addition to the annual training, courses of instruction will be provided for selected non-commissioned officers and men to attend,

at which they will be taught the application of their trades to the care and maintenance of aircraft.

These courses will extend over one month to six weeks, and will be carried out in Royal Flying workshops at the Central Flying School, or Military Wing.

The men will be recruited chiefly from mechanics of the special trades required, and will enlist for a period of four years, with powers to re-engage under certain conditions.

They must accept liability for services abroad in any part of the world, and to perform duties in the management of aircraft, whether on land, water, or in the air.

For the purposes of administration and training they will be commanded by the Officer Commanding, Military Wing, Royal Flying Corps.

The men will receive pay at the Flying Corps rates while performing military duty, and will receive a gratuity of £10 per annum if they carry out their training, and are reported as efficient.

SECOND ILLUMINATED NIGHT FLYING AND FIREWORK DISPLAY, HENDON.

THINGS looked very favourable on Saturday afternoon last for the second illuminated night flying and firework display—which had been postponed owing to the rain from Tuesday night, the 5th inst., although it was just a trifle windy up above. During the afternoon a number of very good exhibition flights were made. At one time there were four machines in the air at the same time—two Blériot monoplanes and two Farman biplanes. The first men away were J. L. Hall and Marcel Desoutter, both on 50-h.p. Gnome-Blériots. After this we were given a taste of biplane airmanship when Sydney Pickles went up on the Caudron biplane and went through some of his usual steady flying. R. T. Gates also put up some exhibition flying, as did Louis Noel, both on Farman biplanes.

Shortly before 5 o'clock, just as it was getting dark, the daylight visitors were given a sample of what was in store for the night visitors—and, perhaps, it was this that induced a number of the former to spend several hours roaming about the enclosures until the "second house"—for Sydney Pickles again ascended, in the 60-h.p. Anzani-Caudron biplane, and switched on his lights. It was, undoubtedly, a pretty sight, especially when he flew over the lit-up workshops and was silhouetted against the rose tinted sky; there was still enough light to distinguish the biplane, yet the tiny electric lamps showed out very brilliantly. From this time, onwards, one could see numerous Boy Scouts making themselves useful—and otherwise—lighting up the many fairy-lamps that lined the enclosures, while the powerful Zeiss searchlight—under the control of Capt. Playfair—on the judge's box, played on the formidable looking "fort" which had been erected near the centre of the aerodrome. Visitors from all parts began to arrive long before the appointed hour, and it was not long before there were considerably over 15,000 people on the ground, whilst they continued to pour in until there were, we should think, round about 20,000.

A little after 7.30, the biplanes, lit up by numerous little electric lamps—the well-known C.A.V. accumulator system of lighting being employed on all the machines—were taxied out to No. 1 pylon. At 8 o'clock the first biplane ascended, the Grahame-White 'bus, and those who had field glasses could recognise the smiling face of R. T. Gates, the energetic manager of the aerodrome. He made circuit after circuit for about 15 minutes, flying rather low at first, and banking at times in an alarming manner; he made a splendid landing immediately in front of the judge's box. After a few minutes' interval Sydney Pickles started on the Caudron biplane with his lights out, so that no one could tell where he was. It was possible, however, to locate him when almost overhead by the flames from the exhaust ports of the engine, which looked like a cluster of stars moving along. When over the enclosure he switched on his lights, and as he flew past, the searchlight was turned on him, lighting up the whole of the machine; one could see him turn round in his seat and look down. He said afterwards, that when the searchlight was on him from behind, the light shining on the propeller made it look like a solid red ring or disc. After flying several circuits at a fair height, continually switching on and off his lights, for about eight minutes, he came down, receiving a hearty round of applause. Then a

Gnome was heard at the far end of the ground, and presently Marcel Desoutter went up on his Blériot monoplane, lit up only by a tail-light. It was most difficult to follow his movements and it was only when the searchlight played on the machine that one could see him properly. At one time he disappeared from view for several minutes, and the occasional roar of his engine was the only indication of his presence in the air. After about 12 minutes of aerial hide-and-seek he came down, and Louis Noel did about 15 minutes scintillating flying on the 80-h.p. Gnome-Henry Farman.

It was then that the first nocturnal aviation accident took place, and it appeared at first that it was serious enough to mar the so far very successful meeting. Gates had just started on the "Wake Up" 'bus with the intention of "blowing up" the fort, but when at the far end of the aerodrome, near pylon No. 4, he suddenly disappeared, while his engine could no longer be heard. A car went out immediately to his assistance, but it was some time before he could be found. When he was discovered he was lying on the ground outside the aerodrome, some distance from the biplane, which was pretty badly smashed up and intermixed with bits of trees. It appears that he could not rise high enough, or did not know that he was so low down, with the unfortunate result that he collided with two trees. The biplane must have swung round, and turned completely over, judging from its position on the ground, and thrown Gates out on to his head. He was conscious when found, and his first inquiry was for the safety of his passenger—he had, in fact, no one with him—and as to what extent the machine was damaged. Fortunately, beyond a rough shaking, slight concussion, and a few cuts, he was not seriously injured, and is, we hear, doing well. In the meantime, while news was being anxiously awaited, Sydney Pickles came to the rescue and eased our minds a bit by making a very fine flight on the Caudron. It was most impressive when, with all his lights out, he suddenly stopped his engine and did a *vol plané*, then turned his lights on and finally started his engine again and swept past the enclosures. When he came down, the crowd gave him a great reception, and above the cheering came the hoots of motor horns—notably Klaxons!

An announcement was then made that Mr. Gates was not seriously hurt, and that the fort would, therefore, be destroyed without further delay. So Louis Noel got away on the 80-h.p. Farman, followed by Sydney Pickles on the Caudron, and between them, with the assistance of plenty of rockets, red fire, &c., they soon left but little of the structure standing. After this followed a really very good firework display—presumably representing the magazine of the fort blowing up—by J. Wells and Sons.

Big as the success of the first night meeting was, the second undoubtedly far surpassed it, and it hardly requires a prophet to foretell that future meetings of a similar nature will become still more popular, although we find ourselves pondering occasionally upon the problem set the visitors of finding seats in the trams and motor 'buses upon the finish of the show. In conclusion, all will hope to speedily see the active manager of the Aerodrome at his work again.



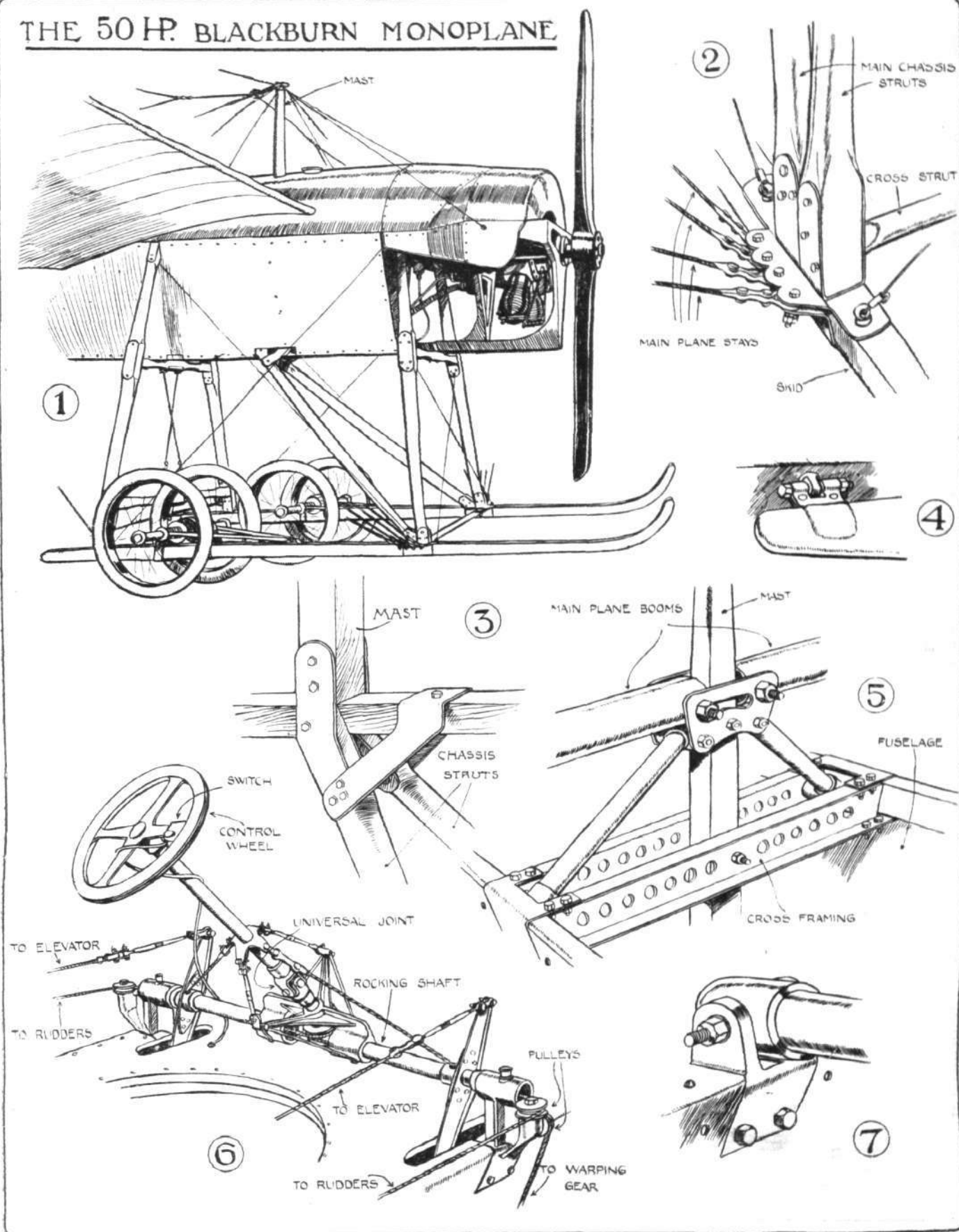
PARIS AERO SALON.—The d'Artois exhibit,



Three views of the Blackburn School monoplane.

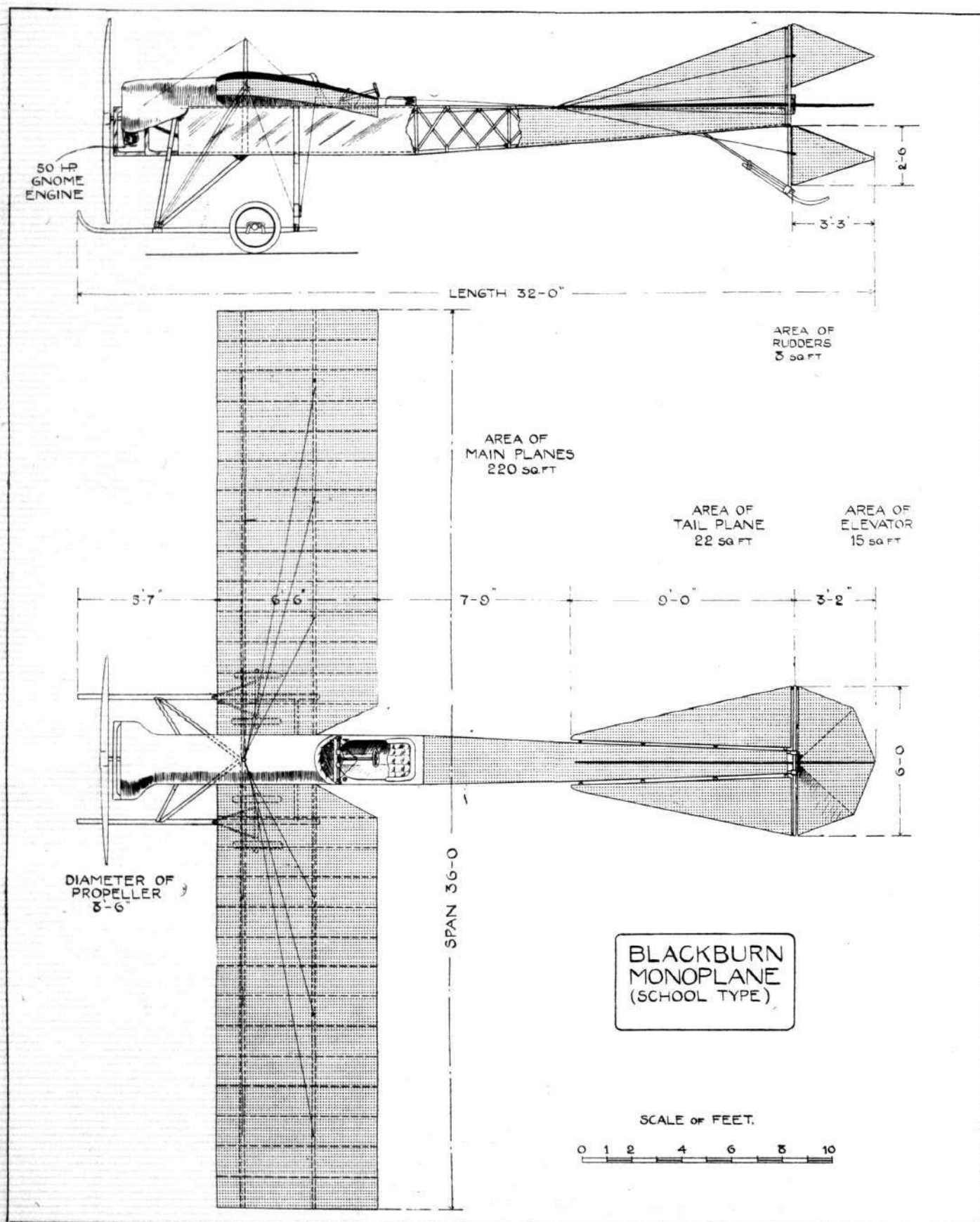
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THE 50 H.P. BLACKBURN MONOPLANE



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Sketches illustrating interesting constructional details in the 50-h.p. Blackburn monoplane, which is used as a practice machine at their school at the London Aerodrome. 1. The landing-chassis; also showing the mast of the cabane. 2. Joint between the front chassis-struts and the skid; the position of the joint is seen clearly in 1. 3. Joint between the base of the mast and the diagonal chassis-struts. 4. Hinge between the elevator and the backbone. 5. Details of the wing attachment to the body. 6. General view of the control system. 7. Joint of the back-wing spar to the body.



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Elevation and plan of the Blackburn School monoplane.

THE BLACKBURN SCHOOL MONOPLANE.

FOR a long time the Blackburn Aeroplane Co. has been working steadily and scientifically up at Leeds and Filey, where they have produced the machines with which they have from time to time made so many excellent flights. It is only comparatively recently, however, that they have established a London centre at the Hendon Aerodrome, and although this may seem to make the Blackburn monoplane somewhat more in evidence than hitherto it has been to Londoners, it will not necessarily bring it more to the fore with readers of *FLIGHT* who have the advantage of being equally in touch with all centres of aviation. It is a British-built machine of British origin and as such has particular claim on the attention of most of our readers, some of the points of design being of special merit.

And, as a complete aeroplane it is well worthy of study, the more so, perhaps, because it is exceedingly simple, and at a first glance represents all that one expects to see as characteristic of monoplane construction. As the eye looks longer at its slim lines, however, the position of the engine well out in front of the wings strikes one as a departure from the conventional, and as one goes closer little points in the chassis construction attract the attention, and notably the method of supporting the wings from a mast, which rises from the floor of the body and which is strutted then by diagonal members of ash to the main chassis skid. It only needs a glance at the elevation of the machine, which is the subject of one of our full page illustrations, to see very clearly that the designer is seeking to overcome the inherent difficulty of providing external drift wires in monoplane construction. By balancing his machine with the engine well forward he has been able to arrange a point of attachment of the wing wires to the chassis skid, which is well forward of the position that ordinarily would be occupied by the engine, and therefore within the zone of interference by the propeller.

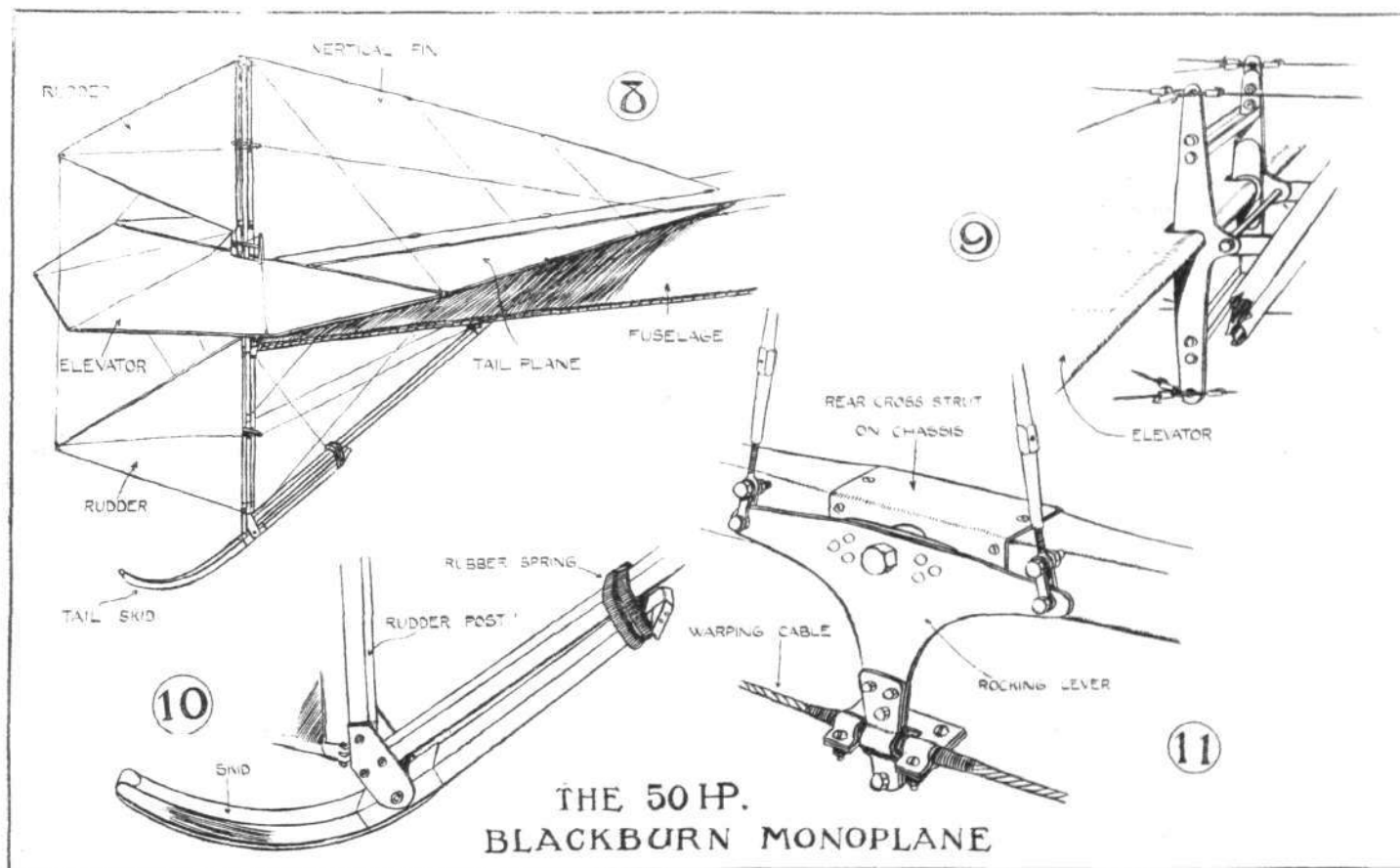
It is unnecessary and also to small purpose to go through the construction of the Blackburn monoplane piece by piece; much of what is interesting therein, but not all that is deserving of notice, forms the subject of our detail sketches which convey to the eye at a glance far more than can be communicated to the brain through a column of print. It is only of importance to draw attention to one or two matters that might otherwise escape notice, as for instance

that the triangular section lattice girder backbone is trussed entirely with ash, no wire being used in its construction. The forward part of the fuselage, forming the body, is surfaced with aluminium and the after part with fabric. Tubular steel main spars filled with timber are now used as the principal wing members, and the details of their attachment to the body are well shown in the sketches. The rear spar is hinged, and when the wings are warped the ribs swivel around it so as to impose no twisting strain. The ribs are made of cotton wood and are prevented from sliding along the spars by the intervention of ash distance pieces. The wing surfacing consists of Irish linen treated with Emaillite. The control is a very interesting feature of Blackburn design, but being one with which all readers of *FLIGHT* ought to be very well familiar by now, we need only draw attention to the sketch in which this detail is illustrated. A single wheel serves for steering the rudder, while the elevator is operated by a vertical movement of the inclined steering column: moving the same sideways, warps the wings. On the school machine, from which these illustrations were made, the power plant consists of a 50-h.p. Gnome engine driving a Blackburn propeller.



An "Aviphobe" Mayor.

EVERYWHERE in France everyone is so enthusiastic on the subject of aviation that it seems incredible that there should be such a thing as an "aviphobe." But, alas, it is so. On Sunday last Vidart and Lacrouze arranged to fly on their Deperdussins from Amberieu to Chalamont to visit some friends, but before starting were handed an order issued by the Mayor of Chalamont, forbidding any public demonstration of aviation without a special permit. They, however, started off and were received at Chalamont by two gendarmes, who duly took notes, &c. Vidart then demanded from the Mayor protection for his machines, and the two limbs of the law were deputed to mount guard until the aviators had concluded their visit and were ready to fly back. It will be interesting to see if anything further happens as a result of the disregard of the mayoral dictator.



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MORE SKETCHES OF BLACKBURN MONOPLANE DETAILS.—8. General view of the tail, showing the elevator and rudder-flaps, which form extensions of fixed fins. 9. The levers by which the control-wires are attached to the elevator. 10. The trailing-skid under the rudder-post, showing the rubber spring. 11. The rocking-lever of the warp, showing the attachment of the wires.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 12th inst., when there was present:—Sir Charles D. Rose, Bart., M.P., in the Chair, Mr. Griffith Brewer, Mr. G. B. Cockburn, Capt. Bertram Dickson, R.F.A., Col. H. C. L. Holden, C.B., F.R.S., Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. Alec Ogilvie, Mr. C. F. Pollock, Com. C. R. Samson, R.N., Mr. R. W. Wallace, K.C., and the Secretary.

New Members.—The following new members were elected:—Lieut. W. M. Armstrong, C. Gordon Bell, 2nd Lieut. H. Le M. Brock, Serge Prince Cantacuzène, E. N. Fuller, Major J. F. A. Higgins, J. S. Lewis, G. Tilghman Richards, Claude Schofield, and Capt. F. St. George Tucker.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

356. Capt. Oliver de Lancey Williams (2nd Royal Welsh Fusiliers) (Bristol biplane, Bristol School, Salisbury Plain).
357. Capt. Herbert Musgrave, R.E. (Bristol biplane, Bristol School, Salisbury Plain).
358. Lieut. the Hon. John David Boyle (Rifle Brigade) (Bristol biplane, Bristol School, Brooklands).
359. Frank William Ierwill (Bristol biplane, Eastbourne Aviation School, Eastbourne).
360. Lieut. John F. A. Trotter, R.F.R.A. (Hydro-aeroplane, Lakes Flying School, Windermere).
361. Herbert Russell (Leading Seaman, R.N.) (Short biplane, Royal Naval Aviation School, Eastchurch).
362. Lieut. Reginald M. Rodwell (1st West Yorkshire Regt.) (Bristol biplane, Bristol School, Brooklands).
363. Capt. Frederick George Kunhardt (74th Panjabis) (Bristol biplane, Bristol School, Salisbury Plain).
364. Major Arthur Baron Forman, R.F.A. (Bristol biplane, Bristol School, Brooklands).
365. Lieut. Richard B. Kitson (58th Rifles F.F., I.A.) (Bristol biplane, Bristol School, Brooklands).

Letter from the Aero Club of America requesting the Club to give its sanction to the issuing of an Aviator's Certificate to Mr. P. H. Reid, a Canadian, was considered, and the necessary permission granted.

British Empire Michelin Cup, No. 1.—The competition for this year closed on October 31st. The Committee, after examining the Observer's Reports and Certificates relating to the aeroplane, unanimously awarded the prize of £500 and trophy offered by the Michelin Tyre Co. to Mr. Harry George Hawker.

Mr. Hawker made four attempts for the Prize, and his flight on the 24th October, 1912, at Brooklands, on the Sopwith Biplane, of 8 hours 23 minutes was the longest flight recorded in the competition. The following is the specification relating to the all-British aeroplane used by Mr. H. G. Hawker:—

Sopwith Biplane; Motor, A.B.C., 40-h.p.
Carburettor, Zenith; Magneto, British Bosch.
Sparking Plugs, British Bosch; Propeller, Bristol.
Fabric, Spencer; Radiator, Spiral Tube.

Mr. F. P. Raynham on the Avro Biplane fitted with a 60 h.p. Green also put up a flight of 7 hours 30 minutes in this competition.

Gordon-Bennett Aeronautical Cup, 1912.—The Committee passed a unanimous vote of thanks to Mr. Jean de Francia, the representative of Great Britain in the recent Gordon-Bennett Race at Stuttgart. Although Mr. de Francia was not successful in securing the Cup for this country, his trip of 41 hours to Kronstadt, on the Roumanian frontier, was a very meritorious performance.

A vote of congratulation to the Aero Club de France for their victory in the race was passed and directed to be sent to the Club.

British Duration Records.—The Committee unanimously decided to accept the following as British duration records:—

1912.
October 24th, 3.12 p.m., F. P. Raynham, Avro biplane, 60-h.p. Green, 7 hrs. 30 mins.

1912.
October 24th, 5.40 p.m., H. G. Hawker, Sopwith biplane, 40-h.p. A.B.C., 8 hrs. 23 mins.

World's Records.

World's Records are recognised by the Fédération Aéronautique Internationale under the following heads:—

Duration.—The longest duration in closed circuit without alighting. Aviator alone or with 1, 2 or more passengers.

Distance.—The longest distance in closed circuit without alighting. Aviator alone or with 1, 2 or more passengers.

Speed.—Greatest speed in closed circuit. Aviator alone or with 1, 2 or more passengers, over 5 kilometres, 10, 20, 30, 40, 50, 100, 150, 200, 250, 300, 350, 400, 450, 500, and so on for every 100 kilometres.

Speed in a given time.—Closed circuit. Aviator alone or with 1, 2 or more passengers. $\frac{1}{4}$ hour, $\frac{1}{2}$ hour, 1 hour, 2, 3, 4, 5, 6, 7, 8, 9, 10, &c. &c.

Greatest Speed.—Speed per hour obtained in closed circuit, irrespective of the duration of flight. Aviator alone or with 1, 2 or more passengers.

Height (above the point of departure).—Aviator alone or with 1, 2 or more passengers.

Stewards of the Club.

Brig.-Gen. David Henderson, C.B., D.S.O., has been elected a Steward of the Club.

Annual Dinner.

The Annual Dinner of the Club will take place in the month of February, 1913. The exact date and place will be announced later.

International Aero Show at Olympia.

The International Aero Show held by the Society of Motor Manufacturers and Traders, under the auspices of the Royal Aero Club, will open on February 14th, 1913, and terminate on February 22nd.

Full particulars can be obtained on application to the Exhibition Manager, Society of Motor Manufacturers and Traders, Maxwell House, Arundel Street, Strand, London, W.C., or the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

In connection with this Exhibition, a section for models will be organised by the Royal Aero Club, assisted by the Kite and Model Aeroplane Association. The Royal Aero Club will offer prizes amounting to £50 in this section. Full particulars can be obtained from the Secretary of the Royal Aero Club.

Members of the Royal Aero Club will be admitted free on production of their membership cards.

Membership of the Royal Aero Club.

The membership of the Royal Aero Club is being added to each week, and a large number of new members have been elected during the year. The Committee, however, hopes that all members will use their best influence in extending the membership. The subscription of those members elected between now and the end of the year will cover the period ending December 31st, 1913.

166, Piccadilly. HAROLD E. PERRIN, Secretary.

Italian Government and Aviation.

THE Italian Military Authorities have now decided to go straight forward with the creation of a Flying Corps which shall include 300 pilots. It has also been settled that the machines to be provided shall be of four types; viz., Bristol, Blériot, Farman and Nieuport, and each of these firms are organising factories in Italy in order that they may comply with the requirements of the Italian Government that the machines must be built in Italy with Italian materials.

Motor Sunday at Hendon.

OWING to the bad weather of Sunday last, Mr. Grahame-White and the directors of the London Aerodrome, Hendon, have arranged that all invitations issued for that day shall be available for tomorrow, Sunday.

Members of the Society of Motor Manufacturers and Traders who have not retained their cards may obtain others on application to the Secretary of the Grahame-White Aviation Company, 166, Piccadilly.

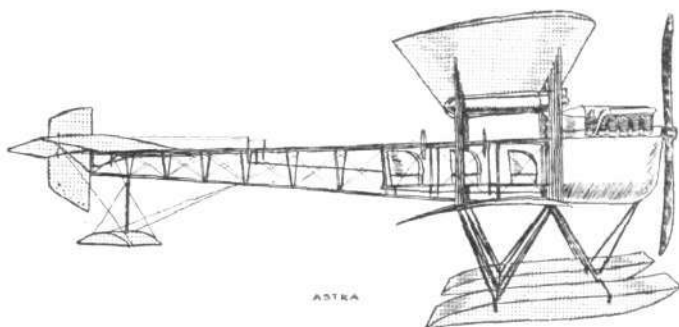
The Paris Aero Salon



(Concluded from page 1028.)

Astra.

THE main differences in this year's Astra machine as compared with the one that figured at last year's Salon, are that it is equipped for water-flying and that steel has been employed largely in its construction. Wood is, in fact, very little used, for only the ribs of



"Flight" Copyright.
The 100-h.p. Astra hydro-biplane.

the main planes and the floats are constructed of it. The main body as before, is of triangular section, but, this year, it is built up of steel tubes, acetylene welded and braced with piano wire. To it in front are attached by more steel tubes, two massive wooden floats of Tellier construction. In the wings, large diameter steel tubes have replaced the old pattern wood spars, and over them the ribs are loosely jointed in such a manner that the warping works with extraordinary freedom. The old system of Wright wing flexing and strut attachment is retained. There are seats for three, the front one being for the observer, and the two to the rear being for pilots, each of whom is provided with controls. Fitted with a 12-cylinder Renault engine of 100-h.p., it looks a machine for serious work. M. Maurice Herbster, who was kind enough to

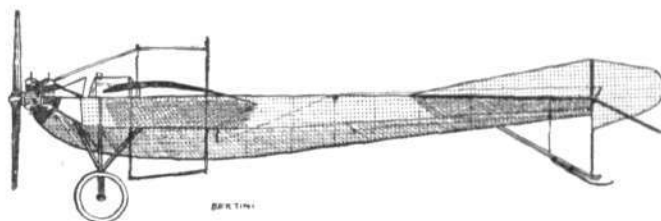
explain its various points to us, gave out a hint that the British Admiralty were considering ordering quite a number.

Bertin.

M. Bertin's machine is a monoplane which follows in its general design conventional practice. Its main body, pentagonal in section, is a girder of wood and steel wire. In front is mounted an 8-cyl. 100-h.p. engine of M. Bertin's own design and construction. The tail has fixed vertical and horizontal surfaces, to which are hinged respectively the rudder and the elevators. Its chassis is built up entirely of steel tubing, and although not highly original, is, nevertheless, extremely neat and effective. Its flexibility is derived from steel compression springs enclosed in the outer oblique chassis struts, the vertical centre ones acting purely as guides.

Besson.

ALTHOUGH its general design remains the same, this machine has changed somewhat in its appearance since it made its *début* at the last Paris Show. Then, the side elevation of the machine in



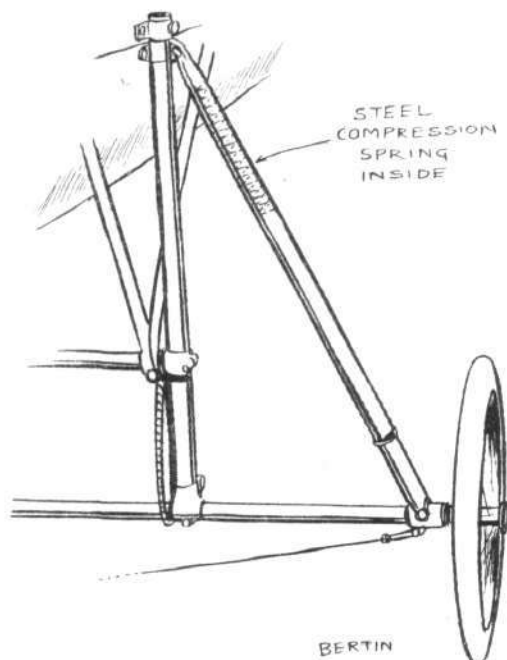
"Flight" Copyright.
The 100-h.p. Bertin monoplane.

the neighbourhood of the pilot's seat was such a curious one, and in fact so was the entire nature of the machine, that many were the questions asked as to the direction in which it flew. Further, it was rather humorous that after about three days of this there appeared on the stand large boards on which were painted equally large arrows to indicate the required direction. This, at any rate



PARIS AERO SALON.—The Clement-Bayard stand.

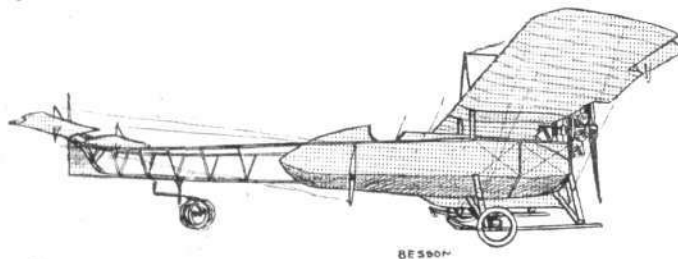
put an end to the exasperating questioning. But we digress. The appearance of the machine as it now stands can be gathered from one of our sketches. It may be seen that it has a triangular



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The landing-gear of the Bertin monoplane.

uselage constructed entirely of steel tubing, acetylene welded. This, in fact, is a system on which the whole machine is constructed even to the wings. The balance of the machine laterally is to a certain extent effected naturally by the turned up wing tips, and by the flexible construction of the trailing edge, but so that lateral equilibrium may not altogether be out of the hands of the pilot,



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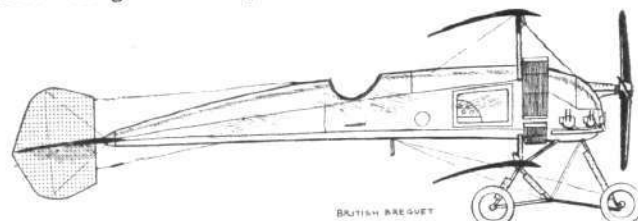
The Besson "canard."

aileron fitted. The machine exhibited is in reality a three-seater and has been designed to fly with an 80-h.p. Gnome engine. At the Show it was temporarily fitted with a similar engine, but of only 50-h.p.

British Breguet.

As we mentioned earlier in our reports, two British firms recognised the wisdom or were in a position to avail themselves of the wisdom, of exhibiting their goods at the Paris Salon. One firm was the Bristol Co., the other Breguet Aeroplanes, Ltd., of 1, Albemarle Street, Piccadilly, W. Under the direction of M. Garnier, the latter firm exhibited a beautifully constructed Breguet three-seater warplane, equipped with one of the new 110-h.p. horizontal Canton-Unné motors. In its main features it is a machine very similar to that which the British Breguet firm sent to Salisbury to compete, last August, in the Military competition there. But as regards its landing gear there is a change, for the single front steerable wheel has been replaced by a pair of wheels mounted on a short axle which is connected to a heavy gauge steel tube extending downwards from the nose of the fuselage by means of a transverse laminated steel spring. We print a sketch to illustrate this point. The rear pair of wheels of the chassis remain as they were formerly, supporting the main weight of the machine through heavy oleo-pneumatic springs of patented design. The body of this machine is covered in entirely with aluminium sheeting, and a very warlike looking job it makes. However, in future machines they intend to cover the fuselage with "Durehide," a type of "synthetic" leather. This material, as a matter of fact, is used on the present machine to

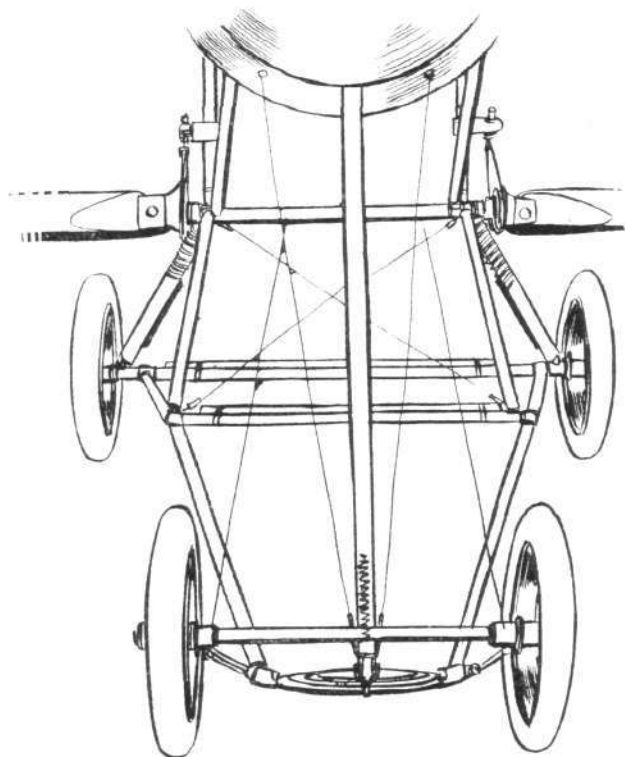
bind the leading edge of the planes, in place of the aluminium sheeting that was formerly employed. One of the most noticeable features of this excellent biplane is the care with which the fuselage has been designed and shaped to avoid as much head resistance as



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The 110-h.p. British Breguet biplane.

possible. This is the chief reason for the setting of the engine in a horizontal position. Another interesting exhibit on the stand was a clever system of dual control, the subject of a patent held by the British Breguet Co. It is so arranged that while the pilot and the observer may have control of the machine, either separately or in unison, the pilot always has command of the situation. By means of a small hand lever he is able at any moment, if the observer is



BRITISH BREGUET

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The new form of chassis fitted to the British Breguet biplane.

driving, to deprive him of the use of his controls. Further, it is arranged, that should the pilot, in action, be killed or so seriously wounded as to render it impossible for him to continue in charge of the machine, the observer may, by reaching behind him and altering the position of the hand lever, transfer the entire control of the machine to his own column.

Breguet Hydro-monoplanes.

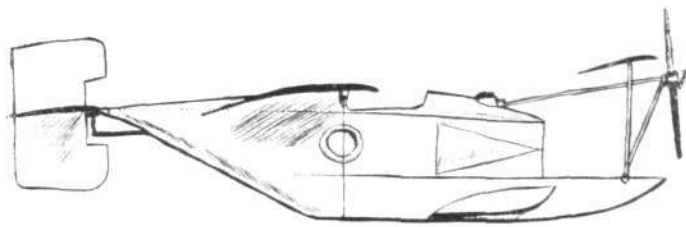
HIGH above the stand of the French Minister of War, at the top of the flights of steps leading to the gallery, rested this novel machine—Breguet's version of what a sea-going hydro-monoplane should be. A glance at our sketch will be sufficient to convey to the reader that it is no ordinary machine.

Its body, short and bluff in relation to the span of the wings, is built of steel tubing, and rests on a huge wooden hydroplane float of rectangular section.

The main novelty of the float is that on either side project auxiliary floats, somewhat of the same shape as those that Fabre constructs, arranged so, to improve the lateral stability of the machine when floating on its liquid element.

In the front of the body is mounted the motor, a horizontal Canton-Unné engine of 110-h.p., which drives, through an

upwardly inclined steel shaft, a four-bladed tractor screw, mounted in front of all. Behind the engine sit the two pilots, side by side, each of them being provided with controls. On either side stretch



BREGUET

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The peculiar Breguet hydro-monoplane.

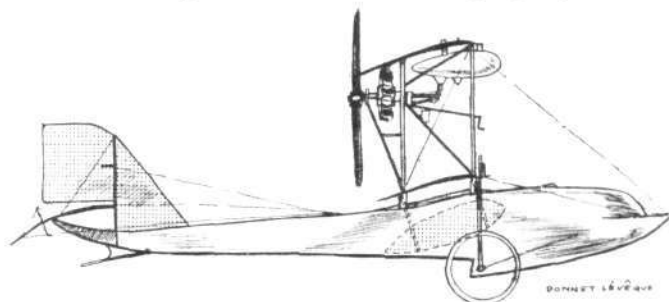
the wings, of customary Breguet design, and behind all, at the end of the rapidly tapering body, is a huge cruciform tail.

Although the work of the machine has not yet been estimated by practical test, it is already the property of the French Navy.

We should imagine that most interesting results will be obtained as soon as experiments are started upon.

Donnet-Lévêque.

The hydro-biplane shown on this stand is of rather more interest than usual, for it was one of the first machines of its type to meet with a measure of success, and for the fact that the British Admiralty have bought one of them. The one shown is of quite light build and is arranged as a two-seater, driven by a 50-h.p. Gnome.

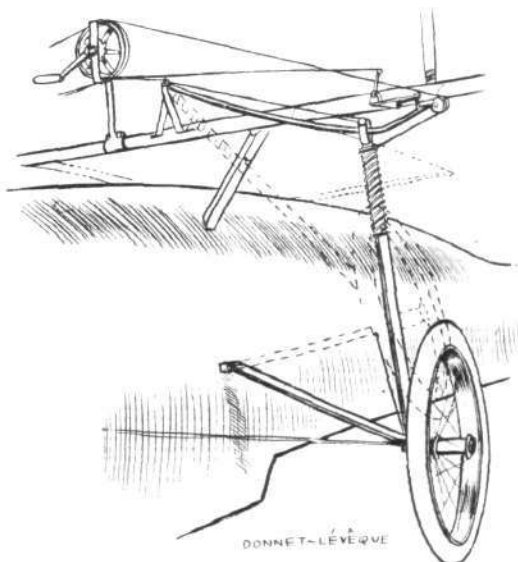


DONNET-LÉVÊQUE

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The Donnet-Lévêque hydro-biplane.

That supplied to our Navy was of much stronger and heavier build, equipped with an 80-h.p. Gnome and intended more for open sea work than for service on river or lake, or stretches of water where



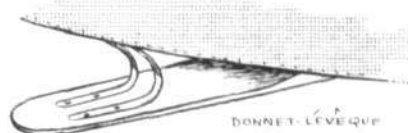
DONNET-LÉVÊQUE

"Flight" Copyright.

The disappearing landing-chassis of the Donnet-Lévêque hydro-biplane.

the surface does not get unduly disturbed. So that it may be used for *atterrissage* as well as *amerrissage*, it is fitted with a clever type of disappearing chassis which may be hauled up clear of the water

by releasing a catch and turning a handle mounted at the rear of pilot's head. Perhaps our sketch will make this point clearer than would be possible by word description. The *coque* is built throughout of mahogany, which wood also enters into the construction of the tail in those parts which are likely to get splashed with or immersed in water. In front the section of the *coque* is rectangular, but aft of the main planes it takes on a section represented by a



DONNET-LÉVÊQUE

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The water-skid at the tail of the Donnet-Lévêque hydro-biplane.

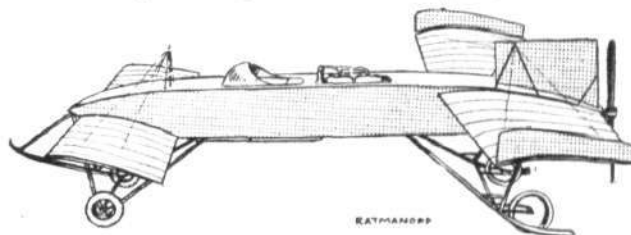
triangle standing on its base. There is a step in the float at a point just below the entering edge of the main planes. At the side of the body it is about 6 inches deep but in the centre it is considerably less, for the bottom of the hydroplane has the peculiarity that it is concave. Naturally there is no tail float in the accepted sense of the term for the *coque* itself acts in that capacity. There is, however, a small wooden plane, shaped more or less like a penguin's tail, which assists in getting the tail off the water when starting off. Inside, the *coque* is divided into watertight compartments, to eliminate the chance of it becoming completely flooded should it strike any hard obstacle and become punctured. Small egg-shaped floats are fitted to the tip of the lower planes to steady the machine on water. The engine is mounted in a position about two-thirds up the gap between the main planes, and provision is made so that the pilot may start it without leaving his cockpit.

Doutre.

HERE there is a biplane which is practically an exact copy of a Maurice Farman as regards its general appearance. Hardly the same, unfortunately, can be said as regards its workmanship. It is fitted with the well-known Doutre system of ensuring longitudinal stability, an explanation of which device appeared in these pages some few months since.

Drzewiecki.

ON the Ratmanoff stand, in addition to "Normale" propellers, is exhibited a peculiar type of double monoplane, constructed to



RATMANOFF

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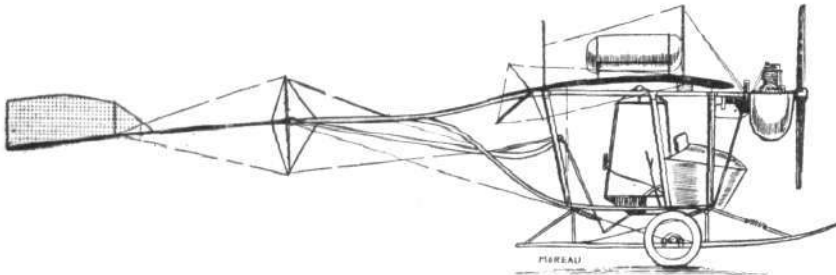
The Drzewiecki double monoplane.

the designs of M. Drzewiecki, under whose licence, by the way, those excellent propellers are constructed. Its central unit of construction is a totally covered-in fuselage of rectangular section, at either end of which are arranged the wings. Those in front are of smaller dimensions than those behind, but meet the air at a greater angle of incidence. They, in addition to sustaining a portion of the weight of the machine, control its altitude in flight. Some little distance behind them sits the pilot, and at his back is the engine, a Labor-Aviation, which drives a propeller at the extreme rear end of the machine through a steel shaft. Steering is effected by vertical rudders pivoted to the tips of the rear wings. Each end of the machine is provided with a landing chassis of its own. In front there are two wheels whose flexibility is controlled by pneumatic springs extending along the base of the body. There is also a nose skid, but it seems to be placed too high to be of much service. The chassis at the rear of the machine is a combination of wheels and skids, the disposition of which can be gathered from one of our sketches. The wheels are sprung by laminated steel springs, such as were used on the new Blériot racer shown at last year's Salon. The machine has not yet flown.

Moreau.

HERE stands a 70-h.p. two-seater monoplane, interesting in that its longitudinal stability is arrived at by automatic means. It has two seats side by side built up in the form of a cage, which is

swung pendulum fashion from the top member of the *fuselage*. It is connected to the tail, a plane surface shaped like a triangle with its apex clipped by a system of steel rods. The main idea of this system is that when the pendulum seat is hanging perpendicularly relative to the line of flight, the tail is in a position which makes for a horizontal flight path. Should the machine tend to climb, the pendulum seat changes its position relative to the rest of the machine and in doing so automatically re-adjusts the tail to restore



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M. Moreau's automatic stability monoplane.

the machine to normal level flight. Should the machine dip the same thing occurs, only of course in the opposite sense. Employing a system of this type it is, of course, necessary to have supplementary elevator controls to carry out such manoeuvres as ascending and descending. This, on the Moreau machine, is effected by an auxiliary lever to the right of the pilot. The machine's lateral stability is to a certain extent natural owing to the design of the wings, but further control is maintained by a lever projecting downward from the framework above, operating ailerons. By M. Moreau's system it is possible to cut the automatic device out of action and maintain control simply by the use of the levers. Improvements have been made on the first model with which M. Moreau experimented. He found that, should the engine stop in mid-air, the pilot's seat swung forward with its own inertia and set the tail for ascent—a very uncomfortable position to find oneself in with one's engine stopped. On the present machine he has fitted a device which detects any tendency on the part of the pendulum seat to swing forward by virtue of its inertia, and which immediately locks the pendulum seat, thus preventing the machine from getting *cabré* owing to engine stoppage. He has found, too, that if the machine encounters a strong gust head on there is a similar tendency for the monoplane to assume a *cabré* attitude. To obviate this, a small aluminium plate is fitted in front of the body normally

to the relative wind, which plate detects any sudden gust and locks the pendulum seat. From a constructional point of view the machine does not possess a great deal of interest, excepting in its chassis which is extremely flexible. The skids themselves are mounted so that they may give fore and aft, parallel to the bottom members of the body, against the restraint of shock absorbers.

Sanchez Besa.

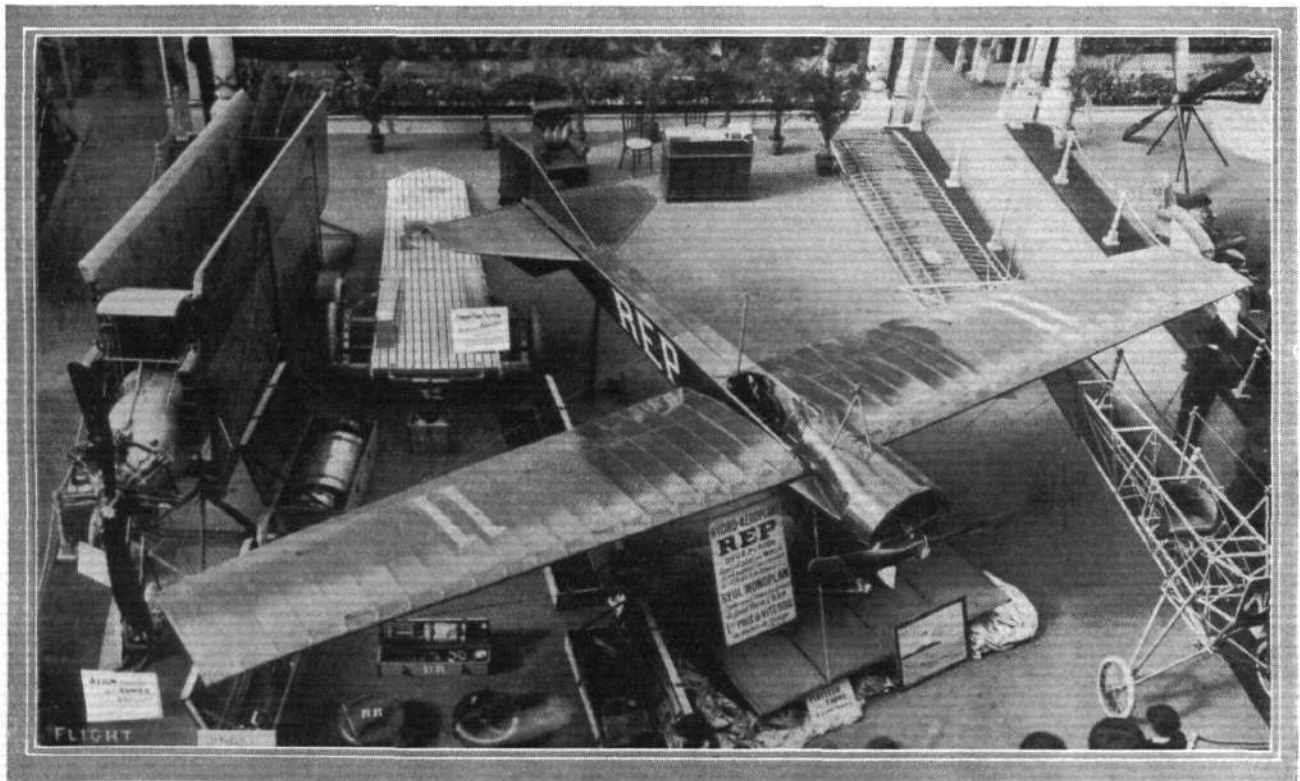
THE biplane they are exhibiting shows, in its methods of construction and the design of its details, an extraordinary amount of Voisin influence. But we can scarcely think that the general design is of the same origin. Primarily it seems that the machine has been designed as a hydro-biplane of the Donnet-Lévêque type, for it has a fuselage somewhat of the same type as the *coque* of that machine, and its main planes are arranged wholly above it. A 75-h.p. Renault is used, which is stowed away in the *fuselage* and which drives by chain transmission a propeller set practically level with the top plane. The landing gear with which it is fitted is purely Voisin. If the machine were a hydro-aeroplane we could probably understand why this disposition had been adopted, but as the machine shown is purely one for use over land, it would be rather interesting to know why the designer has departed so radically from what is recognised as the best possible arrangement of such factors as centres of gravity, of head resistance, and of thrust.

Sloan.

THIS is a tractor biplane which does not seem to have changed in any respect from last year's machine excepting in that a 150-h.p. Laviator engine is fitted in place of last year's 100-h.p. Gnome, and that the peculiar curvature of the main planes is less accentuated. Its main points are that it has a box girder *fuselage* of wood, cross braced with wire, that its tail is of conventional lifting type with rear flap elevators protected from the ground by a bent skid, that its main planes are braced in the ordinary manner with two ranks of struts, and that its landing carriage is of a type descendant from the Henry Farman.

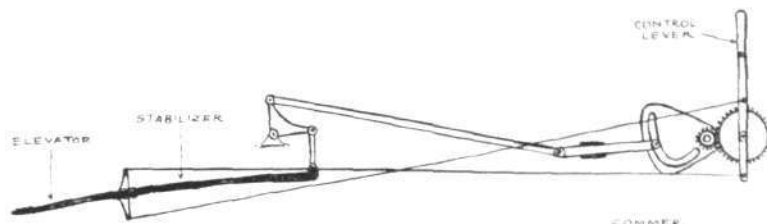
Sommer.

SOMMER is showing two machines—a 75-h.p. Renault engined biplane and a 50-h.p. Gnome-engine monoplane. In neither case, we regret to say, do the machines show any advance on the types that were shown twelve months ago. For the biplane, a good deal of steel is used in its construction, although not nearly to the same extent as was evident in the extremely neat and promising biplane with the single rank of struts between the planes, that Sommer exhibited on his stand last year. The skeletons of the main planes, the tail and the front elevator, and the strutting of the *cellule* are of wood. The tail outriggers, elevator outriggers and chassis are of steel tubing. Sommer has abandoned his original idea of mounting



The 80-h.p. R.E.P. hydro-monoplane, with its single main float. To the left is a R.E.P. Avion packed ready for road transport.

his pair of landing wheels on a long common axle. In his new form of chassis each wheel is sprung from a pair of supports in such a manner that if the machine landed in any sort of a side wind,



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Diagrammatic sketch of the new form of control fitted to the Sommer monoplane.

they could do nothing but collapse. From one of each pair of supports on either side of the machine, long curved tubular skids extend forward to meet the front elevator. They, too, seem of little use, for the steel tube must be insufficiently solid to avoid a smash should the machine land nose down, a contingency for which skids of this type were originally designed.

The main novelty in the monoplane is a new system of control whereby the surface that ordinarily constitutes the fixed lifting tail, may be varied in attitude according to the degree of deflection that the rear elevating flaps are given. From the diagrammatic sketch we print can be gathered an idea of how this movement is effected.



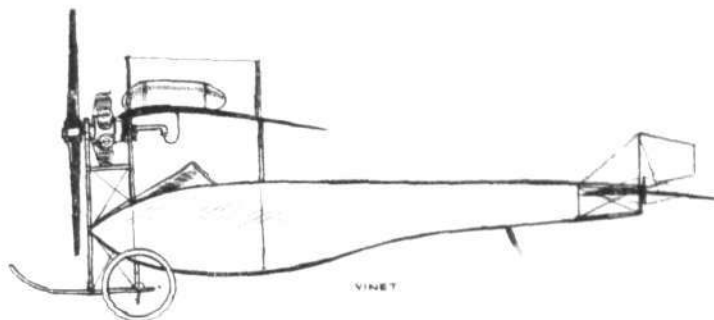
Some Valuable Aviation Accessories.

ANZANI certainly deserves every congratulation on the excellence both in design and construction that his motors now present. At the Paris Show he exhibited six models, particulars of which will be found in tabular form on another page of this issue. The "Emallite" firm, too, presented an imposing exhibit of their well-

Presumably the object of this system is to provide a more powerful control, and we can but remark that, if this is indeed the case, the designer could have achieved his object without resorting to such complicated means.

Vinet.

A 50-H.P. Gnome-engined monoplane is exhibited here. Like many more machines in the Show, it does not seem to have changed



"Flight" Copyright.

The 50-h.p. Vinet monoplane.

one whit. Since last year, its main peculiarity is that its body, totally enclosed with fabric, is slung below the wings, the engine, however, being mounted on a level with their leading edge.



known fabric varnish and sheets of transparent material made from its same base. Their output has grown from 300 litres in 1910 to 70,000 litres for the first ten months of this present year. The General Aviation Contractors, Ltd., of 30, Regent Street, W., are fortunate enough to hold the sole agencies for the British Empire of Anzani engines, "Emallite" and, by the way, Rapid propellers, which have proved themselves so highly efficient.



Miss Bernetta Miller, an American aviatrix, who has been flying a monoplane in America recently.

FROM THE BRITISH FLYING GROUNDS.

Brooklands Aerodrome.

ON Saturday last week, Mr. Petre, on the Martin-Handasyde monoplane, whilst finishing a magnificent spiral *vol plane* made a miscalculation and had a fall, but was luckily unhurt, the only damage done being to the machine.

In the Altitude Competition, owing to the gusty wind, only two competitors turned out, with the result that Mr. Barnwell, on the Vickers monoplane, secured the prize by attaining a height of 3,800 ft. Mr. Hawker also started on the Sopwith biplane, but omitted to start the barograph, and the exact height reached by him was not therefore recorded.

The Quick Starting Competition, which was to have taken place on Sunday, had to be abandoned owing to the strong wind.

On Saturday next, the 16th inst., a Bomb Dropping and Alighting Competition will be held, in which the following will compete:—Mr. Hawker (Sopwith biplane), Mr. Merriam (Bristol biplane), Mr. Bendall (Bristol biplane), Mr. Pashley (Sommer biplane), Mr. Spencer (Spencer biplane), Mr. Ducrocq (Farman biplane), Mr. Percival (Caudron biplane), Mr. Barnwell (Vickers-Farman biplane).

On Sunday next an interesting Relay (Despatch Carrying) Competition will be held. A pilot of a biplane will start off with the despatch, fly one lap, land, hand despatch to a pilot of a monoplane, who will also fly a lap, then alight, and hand despatch to judge, and the fastest pair (biplane and monoplane) will be the winners.

The following is a list of the entries:—Mr. Barnwell (Vickers monoplane), Mr. Knight (Vickers monoplane), Mr. Raynham (Flanders monoplane), Mr. Petre (Martin-Handasyde monoplane), Mr. Ducrocq (Farman biplane), Mr. Spencer (Spencer biplane), Mr. Merriam (Bristol biplane), Mr. Bendall (Bristol biplane), Mr. Hawker (Sopwith biplane), Mr. Percival (Caudron biplane), Mr. Pashley (Sommer biplane).

Bristol School.—Wind was too bad for flying on Monday morning last week, but Merriam tested conditions in the afternoon, and then took Lieut. Empson for tuition. Bendall was up with Mr. Loyd, and then behind Lieut. McLean on straights. Merriam took out Mr. Loyd and Lieut. McLean. Major Forman, Lieuts. Kitson and Rodwell each out for good solos, Bendall finishing up evening with a solo.

On Tuesday it was raining hard first thing, Merriam testing flying solo till arrival of pupils. Bendall took Mr. Loyd and Lieut. Kitson, latter ascending for solo afterwards. Merriam up for another flight, finishing up morning's work. Wind had increased by the evening, and flying was not attempted.

After trial of conditions, by Merriam, on Wednesday, Bendall took Lieut. Empson, and Mr. Loyd was given a tuition flight by Merriam, the pupil taking charge of the controls. Major Forman and Lieuts. Kitson and Rodwell all out for two solos each, and Lieut. Rodwell then successfully passed the tests for his *brevet* in really first-class style, keeping a good altitude throughout, and landing well. Merriam was busily occupied by Mr. Loyd, giving pupil instruction in landing and right-hand turns. At 10.30 Merriam again up for a test with Lieut. Kitson as passenger, flying high. Major Forman and Lieut. Kitson both flew very fine solos, the latter describing several figures of eight. School work was resumed in the afternoon, Merriam flying with Lieut. Kitson, who then ascended alone, and flew remarkably well, doing left and right-hand turns with neat landing. Major Forman did well in the solo he made with figures of eight.

On Thursday, after Bendall had made the test, Major Forman and Lieut. Kitson both put up fine performances in the solos they made, and both these pupils should easily pass for their ticket. Merriam was up behind Lieut. Empson for several straights, who will now commence solo work. Major Forman went out for his *brevet*, and accomplished the tests very well, his landings being perfect.

Later in the morning Merriam was out with Lieut. Empson, who was in the pilot's seat. Bendall took Mr. Loyd for a flight, but the wind was far too strong for any more school work. In the afternoon Merriam was out for a test, but found weather unfavourable. Later out again with Lieut. Kitson, Bendall having Lieut. Empson as passenger. Lieut. Kitson made a good solo, but darkness prevented further work.

Wind was very bad all day on Friday, and no ascents were made, work being confined to assembling machine just recently received from Filton.

Saturday, good work was done in the morning. Merriam and Bendall being very busily occupied in taking the pupils up for tuition trips. Lieut. Kitson satisfactorily underwent the tests for his ticket, flying at a good height and with good landings. This makes the third pupil to qualify for his certificate this week at the Bristol

School at Brooklands, and certainly speaks well for the methods adopted in teaching pupils how to fly. Merriam out again in the afternoon, but weather certainly not good. Later out with Mr. Featherstone but no improvement, and the only other trip was made by Mr. Merriam, who took Lieut. Kitson as passenger. Too windy for flying all day Sunday.

Howard-Flanders School.—Raynham on Wednesday of last week was up for a quarter of an hour solo at about 1,000 ft., he afterwards taking up Dukinfield Jones for about 20 mins. over surrounding country. Thursday he steered away in Staines direction for half-hour's flight in morning. After lunch he made circuits, solo for quarter-hour, then took Jones for half-hour in Staines direction up to 2,000 ft. Circuits again for about 10 mins. solo in the evening. Next day he was flying for over an hour on F 4 No. 1 machine with new wheel-base, for official test, at Farnborough. This machine has now passed all its tests. Saturday, Sunday, Monday, and Tuesday no flying—weather awful.

Eastbourne Aerodrome.

TUESDAY morning, last week, Mr. Hammond was on the Bristol giving instruction to Messrs. Thompson and Roberts, he also gave Gassler a joy ride and incidentally took him home to lunch, landing in a field at the back of Gassler's house. The afternoon turned out wet and prevented any further practice.

Wednesday, the weather was perfect nearly the whole day, but as all the pupils were away, no work was put in. Mr. Fowler's Blériot is in dock, undergoing a general overhaul.

In the afternoon, Thursday, Messrs. Roberts and Thompson had their first experience of the pilot's seat, and with Mr. Hammond sitting behind they made several quite good flights, although at times their steering was somewhat erratic. To finish up the afternoon Mr. Hammond gave his wife a flight.

There was quite a fair breeze all the early part of Friday, but by 3.30 p.m. it had gone down considerably. After making a solo, Mr. Hammond decided the conditions were not good enough for either Roberts or Thompson to take the pilot's seat, so he gave Roberts some landing instruction. By 4.15 the wind had freshened a good deal and put an end to any more flying.

Saturday Mr. Hammond commenced work early, making several flights with Thompson in front. Roberts turned up later and made a short flight. The Bristol was pulling so well that Mr. Hammond thought he would like to try her with two passengers; taking up Dowsett and Ford, two of the school mechanics, he made an excellent flight and succeeded in getting up to over 500 ft. Capt. Danvers had chartered the Bristol to take him over to Heathfield,



Lieut. R. G. Murray, who, on a Bristol biplane, has recently obtained his pilot's certificate at Fowler's school, Eastbourne.

where he resides. A start was made about 12.15, but by this time the wind had got up considerably and Mr. Hammond found it so gusty that he came back. After dropping Capt. Danvers he tried a solo, but found it very nasty even with only one in the machine, so the trip had to be abandoned.

Farnborough.

Royal Aircraft Factory.—Wednesday, last week, Mr. de Havilland when out testing 211, landed on Laffan's Plain owing to his petrol pipe disconnecting. Later on he took out his old machine, of the Maxim gun fame. M. Verrier was on Maurice Farman, which is to be handed over to the R.F.C.

Mr. de Havilland, Friday, was on 211 finishing tests and handing her over to R.F.C. Also on BE 2 and BE 5, the latter, which has just come out of the factory after being renovated, being fitted with an E.N.V. engine. Mr. Parr, late of Hendon and the pilot of the Piggott biplane, out doing straights on BE 2, finishing by landing heavily after a "nose dive," and cutting the undercarriage clean away, luckily without hurting himself. M. Verrier flew over on Maurice Farman, flying in his usual daring style, and taking up several employees of the R.A.F. He is evidently determined to dispel all doubts, as regards the construction of the Farman machines, that may be in the minds of the factory officials, and put a stop to all the petty prejudices that are apparently so rife in any machine other than the BE type. Mr. Raynham was passing tests on Flanders, flying particularly well. The climbing powers of the machine are exceptionally noticeable.

Royal Flying Corps.—Capt. Derbyshire, Lieuts. Longcroft and James, Wednesday, last week, were on 206. Capt. Becke and Lieut. Herbert on 215. Lieuts. Shepherd and Playfair also on 215, and Lieut. Wanklyn was doing straights on same machine. Sergt. Hunter up for 20 mins. on 210, making a trip over Fleet and Caesar's Camp. Next day Lieuts. Shepherd and Playfair were practising on 213, Lieut. Wanklyn doing straights, whilst Capt. Becke and Lieut. Herbert put in several good flights on 215, Capt. Webb-Bowen and Derbyshire, Lieuts. Longcroft and James being out on 206.

Friday, Capt. Webb-Bowen, when on 206, landed heavily, the Nieuport type "spoon" which is fitted to the skid coming into contact with the propeller. Saturday, Lieuts. Playfair and Shepherd were up on 213, and Lieut. Playfair, after making a good circuit, landed heavily, breaking the forks on front wheel. Monday and Tuesday, both blank days owing to the high wind.

Liverpool Aviation School, Waterloo.

On Thursday, last week, Melly did a cross-country flight on the V-engined machine. Following the beach northwards for a

distance of 12 miles and getting to a height of 1,500 ft. he turned inland over Formby Golf Links, thence to within a mile of Aintree racecourse, by which time he reached a height of 3,100 ft. Then turning seawards again he found the wind heading so strong that he was unable to make any progress, so came down to 2,000 ft., from which level he was able to get back to Waterloo, planing down to within 100 ft. of the hangars and doing a neat figure of eight before landing. Distance covered 26 miles and in the air about 30 mins.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, school started at 9.45 very briskly under Mr. Noel's supervision with Mr. Howard Wright doing straights, Lieut. Birch, Mr. Francis and Major Madocks all doing straights on No. 7 biplane; Mr. Davis rolling on No. 4 biplane. It being a fine calm morning each pupil got in good steady practice.

Pupils out Wednesday with Instructor Noel quite early. Lieut. Birch, Mr. Francis and Major Madocks each flying for 20 mins. straights on No. 7 biplane. Mr. Fowler doing straights for quarter of an hour on No. 2 machine. Mr. Davis rolling on No. 2 machine. Afterwards Lieut. Birch doing circuits with Mr. Noel. Later in the morning at 10.30 Lieut. Birch, Mr. Francis and Major Madocks doing straights with Instructor; Mr. Fowler doing 20 mins. straights on 35 Blériot monoplane, afterwards 10 mins. straights on No. 2 biplane. At 12.50 Mr. Noel took Mr. R. H. Carr for a straight flight. In the afternoon he took up Mr. Francis and Lieut. Birch for straight passenger flights on No. 7 machine, after which the latter pupil made two solo straight flights. A very good day's work was done, the pupils, one after another using the machines right up to dusk.

Saturday, at 7.40, school opened with Lieut. Birch and Mr. Howard Wright doing straights on No. 7 machine under Instructor Manton, Mr. Francis with Instructor Manton doing straights. At 8.15 Lieut. R. G. D. Small started rolling practice.

Sunday being very boisterous, there was little flying. Mr. Noel, to save disappointment, went up on the 80-h.p. Farman machine, but after two or three circuits was compelled to come down owing to the rain and wind.

Aircraft Co. School.—Wednesday, last week, Verrier flew the French-built Maurice Farman to Farnborough in a thick fog, carrying a pupil as passenger. Next day he was out testing British-built Maurice Farman, which machine is an exact replica of those built in France. At 11 a.m. he left for Farnborough, carrying Lieut. Waldron as passenger. In the course of the afternoon he passed the necessary Government tests with both British and French machines.

Blackburn School.—Monday, last week, at 10 a.m., Mr. H. Blackburn took the *brevet* machine for a 10 mins. flight to test air conditions, after which Dr. Christie had half an hour's practice in straight flights. Dr. Christie shows good progress week by week in spite of his scant opportunities, he being able to attend only at the week-ends. Then Messrs. Buss, Glew and Laurance Spink went in turns, doing straight flights for an hour, particularly practising landings. Dr. Christie followed with 15 mins. practice. During Mr. Spink's practice a gudgeon pin came loose in the Gnome, this meant dismantling the engine, and on doing so a connecting rod was found bent.

Tuesday and Wednesday were spent by pupils in shed, receiving instruction in care and repair of Gnome engines, and the next two days weather was too bad for school.

Saturday morning, Mr. Blackburn made a test flight of 15 mins., afterwards Messrs. Buss and Spink had the *brevet* machine to themselves for an hour and made good progress. Next morning pupils assembled, but bearing in mind the precarious condition of Mr. Gates, the racket of an aeroplane engine in his vicinity was not to be thought of.

Blériot School.—M. Gratien went up for the tests for his certificate, Monday, last week, and after doing three very good figure eights at about 100 ft., found his lubricating system at fault and wisely came down, making an excellent landing. After the trouble was located, however, the wind rose and further flying was impossible for pupils.

Wednesday, he again went up for his *brevet*, and quickly getting up to 200 ft., did most of his test at nearly this altitude. M. Gratien was one of the quickest pupils at the school to obtain his *brevet*, having joined less than two months ago, and during his tuition has had no breakages whatsoever. Mr. Welburn went up for circuits afterwards on L.B. 2, but for some reason switched off his engine when doing a nicely banked turn, with the result that the machine suffered somewhat severely.

Deperdussin School.—Monday evening, last week, weather allowed a little practice before dark, and Capt. Macdonald took out taxi 2 for practice. Instructor Brock testing same machine before dark. Master Macdonald receiving his aerial baptism which he greatly enjoyed in school taxi.



A couple of flying Australians at Lark Hill, Salisbury Plain.—Mr. Vincent P. Taylor (well known in the balloon world as "Captain" Penfold) in front on the two-seater Military Bristol, and on the right Mr. Eric Harrison, one of the Bristol Co.'s instructors.

Pouring rain and mist all day Tuesday made school work impossible. Two-seater "Dep." being made ready for Nardini and Instructor Brock for night flying. Night flying and fireworks postponed till Saturday.

Wednesday, Capt. Macdonald and Mapplebeck on taxi 2 putting in good practice during the morning. Straight flights and landings specially good. Spratt out with two-seater making left and right turns at 300-400 ft., up for 20 mins. doing very wide circuits, very steady and sure of the machine. Instructor Brock first took up two-seater with Mapplebeck as passenger for joy-ride, four good circuits and a trip over the "Harp" and back concluded a splendidly steady performance. Whitehouse, Mapplebeck and Macdonald all doing their best to get as many trips as possible on taxi 2 while the weather lasted. Altogether a splendid morning's practice flying for all.

Later, Instructor Brock took Whitehouse in two-seater a couple of turns round ground for joy-stunt, and afterwards handed machine over to Spratt again.

Taxi 2 out for practice Thursday with Mapplebeck, Whitehouse and Capt. Macdonald, each doing capital work up till lunch time.

Monday, wind and rain prevented any work for pupils.

W. H. Ewen School.—The climatic conditions at Hendon interfered considerably with out-door practice during the past week, but with the pupils taking advantage of every fine spell, considerable progress was made. On Monday M. Baumann had out the school monoplanes at 11 a.m., and Messrs. L. Russell and H. Gist got in some good straights. In the afternoon Mr. Sydney Pickles was out with the 60-h.p. two-seater Caudron biplane, putting up fine exhibition flights in a very tricky wind.

On Tuesday work was confined to the hangars owing to wind and rain, but flying practice was resumed on Wednesday morning. Instructed by M. Baumann, Lieut. M. W. Noel and Mr. W. Warren were flying good straights on monoplane No. 2. After the luncheon interval M. Baumann was again out with the school monoplanes, and Messrs. Lawford and Gist and Lieut. Noel were all flying well on No. 2, and Messrs. Zubiaga, R. S. McGregor, E. Prosser and N. E. Cowling all making good progress on monoplane No. 1. Mr. J. Torr, a new pupil at the school, got his first lesson in controls. Later Mr. Pickles had out the 35-h.p. two-seater Caudron biplane, and after a fine exhibition flight handed the machine over to Messrs. Lawford and Warren who each did several straights.



Lieut. Eric Conran, who last week successfully passed his *brevet* tests on a 35-h.p. Caudron biplane at the W. H. Ewen School, Hendon.

On Thursday pupils were out at 8 a.m. Under the instruction of M. Baumann, Lieut. Noel was flying good straights at 30 ft. on monoplane No. 2, and Messrs. R. S. McGregor and M. Zubiaga were showing good progress on monoplane No. 1. In the afternoon Mr. Pickles made several splendid exhibition flights on the 60-h.p. Caudron biplane, showing the remarkable gliding powers of the machine in a well judged spiral *vol plané* from 2,000 ft.

Salisbury Plain.

Bristol School.—No flying was possible all day Monday, last week, the weather being far too bad. On Tuesday Harrison first up making a solo test of a recently erected biplane, then taking Mr. Featherstone on the same machine. England on another biplane with Captain Kunhardt, Harrison taking Captain Penfold.



Mr. Norman Spratt, who recently has taken his *brevet* in excellent style at the Deperdussin school at Hendon.

Prince Cantacuzene made two very fine flights on one of the tandem monoplanes, flying extremely well. However, the wind was too rough for pupils' biplane solos. Pixton and Busted were both out in the evening, testing new machines. School work was impossible, as the wind was too strong.

At quite an early hour on Wednesday Harrison was out with Mr. Featherstone, Captain Penfold later setting out for a solo, making a really fine flight with landing. Harrison was out with Capt. Penfold to show him course for *brevet*. Pizey taking Capt. Kunhardt for a similar purpose, this latter pupil going out for two remarkably fine solos with figures of eight. Pizey was behind Mr. Featherstone for a trip, giving the pupil practice in foot control. Pixton and Busted both testing machines, but fog prevented further flying.

Weather had somewhat cleared in the afternoon, and after ascending with Pizey for a test, Capt. Kunhardt successfully underwent the tests for his certificate, landing well at the end of each series of eights, and maintaining a good height throughout. Lieuts. Lawrence and Ashton were his observers. Pizey took Mr. Featherstone for a trip, this pupil sitting in the pilot's seat, and later taking up Lieut. Shekleton. Capt. Penfold was shown over the *brevet* course by Harrison, who then ascended as passenger to Lieut. Shekleton. Pixton and Harrison out again testing monoplanes, and putting up some really fine stunts. Capt. Penfold set out for his certificate, but flew too low, and will therefore have to make his attempt again. Prince Cantacuzene was out for some fine trips on one of the Bristol monoplanes, finishing each flight with a good *vol plané*. Sippe made a very good flight on one of the tandem monoplanes, completing several circuits, and handling the machine splendidly.

On Thursday Harrison was out for the test, afterwards taking Capt. Penfold for figure of eight practice, this pupil then making two good solos. England was on a biplane with Mr. Featherstone, but the weather was not favourable enough for any more flying.

Busted was out quite early in the afternoon on one of the 80-h.p. Bristol monoplanes, taking several passengers. Pizey tested conditions for school work, taking Mr. Featherstone. Sippe was flying beautifully on the Bristol, Harrison taking Mr. Rees, a new pupil, for his first trip. Prince Cantacuzene performed really well in the number of flights he made, his *vol planés* being perfect. England was on a new monoplane for a test, taking a mechanic as passenger.

No flying all day Friday, weather too bad.

Saturday, Pizey took Mr. Rees for several tuition flights, and pupil is shaping quite well. Lieut. Williamson, R.N., an old Bristol pupil, was out for a practice flight, and showed himself to be

a capable flyer. Pizey, out with Capt. Penfold, showing the pupil the *brevet* course, and Sippe was in the meantime on one of the tandem monoplanes for several wide circuits. Wind rising prevented further work. Pizey was up in the afternoon for a test, taking with him Lieut. Rees and then Capt. Penfold. Pixton was out with a lady passenger for two trips, and Pizey made a solo on one of the tandem machines. Sippe also making a trip on the same machine, but darkness prevented further flights.

Royal Flying Corps.—The first flying last week was on Thursday, when in the morning Capt. Allen was on 205 for 26 minutes, and Lieut. Lawrence had the same machine out for half an hour at a height of 2,000 ft. Major Higgins was on biplane 203, and although this was his first flight on a BE type machine, he showed complete mastery over it. Lieuts. Wadham and Anderson and Major Brooke-Popham each made flights of about half an hour on 205, while Lieut. Ashton went up 2,000 ft. on 203. Lieut. Wadham also took up Private McCudden for half an hour. In the evening, both Lieuts. Lawrence and Wadham were flying with Lieut. Le Breton on 205, and the former officer also made two other trips, while Lieut. Ashton was out on 203. On Friday morning Lieut. Wadham was first out on 205, and Lieut. Lawrence and Major Brooke-Popham subsequently made flights on the same machine, and Lieut. Fox made a couple of half-hour trials on 203. In the evening, Lieuts. Fox, Wadham and Lawrence each made several ascents.

Upavon (Central Flying School).

THE officers and men at the Central Flying School, evince great interest in their work, and some fine performances are to be witnessed whenever there is the least chance of the weather permitting machines to be out.

The school aerodrome is open to every wind that blows, and the surroundings are full of queer air currents. The big dip in the middle of the flying ground and the Avon valley on the west set up *remous* of their own peculiar kind in different winds, and the cliff at the back of the officers' quarters, known on the Ordnance map as Bowden's Cleeve, sends up vertical air currents which can be felt at a considerable height. One can notice, when a strong north wind is blowing, that the rooks take advantage of these vertical air currents to indulge in some fancy soaring to great heights. It is pretty certain that the pilots turned out at the Central Flying School, will be able to handle machines over almost any kind of country.

Monday, last week, the weather was mild and the atmosphere damp and hazy. Capt. Fulton took up Petty Officer Andrews for instruction, and about 40 minutes' good work was put in, on the Avro 406. Capt. Salmond afterwards went for a trip over Tidworth and back on the same machine. The same officer then went with Lieut. Martyn on Avro 404 to the practice ground, and was afterwards out with Lieut. Hubbard.

Tuesday morning, very damp and misty. Capt. Salmond set out on Avro 406 with Lieut. Martyn for east side of the aerodrome, along by Grant's firs, where Lieut. Martyn practised handling the machine over the gallops for about thirty minutes. Lieut. Longmore was on the Maurice Farman 403 with Lieut. Smith-Barry for a short spin round the aerodrome, and Lieut. Smith-Barry afterwards took a turn round in the same machine alone. Lieut. Freeman then went as passenger with Lieut. Longmore for a longer trip. The machine was lost to view several times in the low-lying clouds, and could only be located by the rapid chatter of the 60-h.p. Renault. After going once round the aerodrome, the machine just touched the ground for some little distance, and without apparently slackening speed went round for another circuit. Lieut. Abercromby was on Avro 406 twice round the aerodrome, by which time the weather was changing and threatened fine rain, a touch coming up with a slightly freshening wind. Lieut. Smith-Barry then took the machine up for a couple of circuits. The Short Tractor was out round the Aerodrome with Major Gerrard as pilot, he afterwards going out on Short Biplane 401 for a few minutes. The name Short Tractor seems rather inappropriate for the tractor machine; for when in flight it looks anything but what its name suggests, with its long tapering fuselage, and has already been dubbed the long Short Tractor. A peculiar feature of this machine appears noticeable when in flight. The *empennage*, instead of being at a level or slightly drooping, seems to be elevated considerably, even when the machine is climbing, and gives it a decidedly jaunty appearance compared with the old type of biplane, dragging its tail behind it.

Capt. Fulton took the Avro 404 out for a few minutes on Wednesday to test the undercarriage, and afterwards put in some considerable time instructing Lieut. Young and Lieut. Lushington. Lieut. Hubbard was also out with Capt. Fulton on the same machine for a few minutes. In the afternoon Capt. Fulton again went out on Avro 404 for a couple of trips, taking up Sergt. Jarvis the first time for a quarter of an hour, and the second time taking up Leading Seaman Bateman for two circuits. Lieut. Young then

went twice round the aerodrome on the same machine. Lieut. Shepherd was on the Short Tractor for a couple of flights, and Major Gerrard then made several trips on the same machine 413, taking up Lieut. Allen, Air-Mechanic Edwards, Sergt. Baker, Air-Mechanic Copper and Lieut. Archdale in succession for an average of ten minutes each.

The following officers were also out on Short Biplane 401: Major Gerrard with Leading Seaman Prichett up for instruction, Lieut. Pepper two solos, Lieut. Allen one solo and Lieut. Atkinson a solo. Major Gerrard then took up Lieut. Freeman, who afterwards went out alone for a few minutes. Leading Seaman Brady was also taken out by Major Gerrard for instruction.

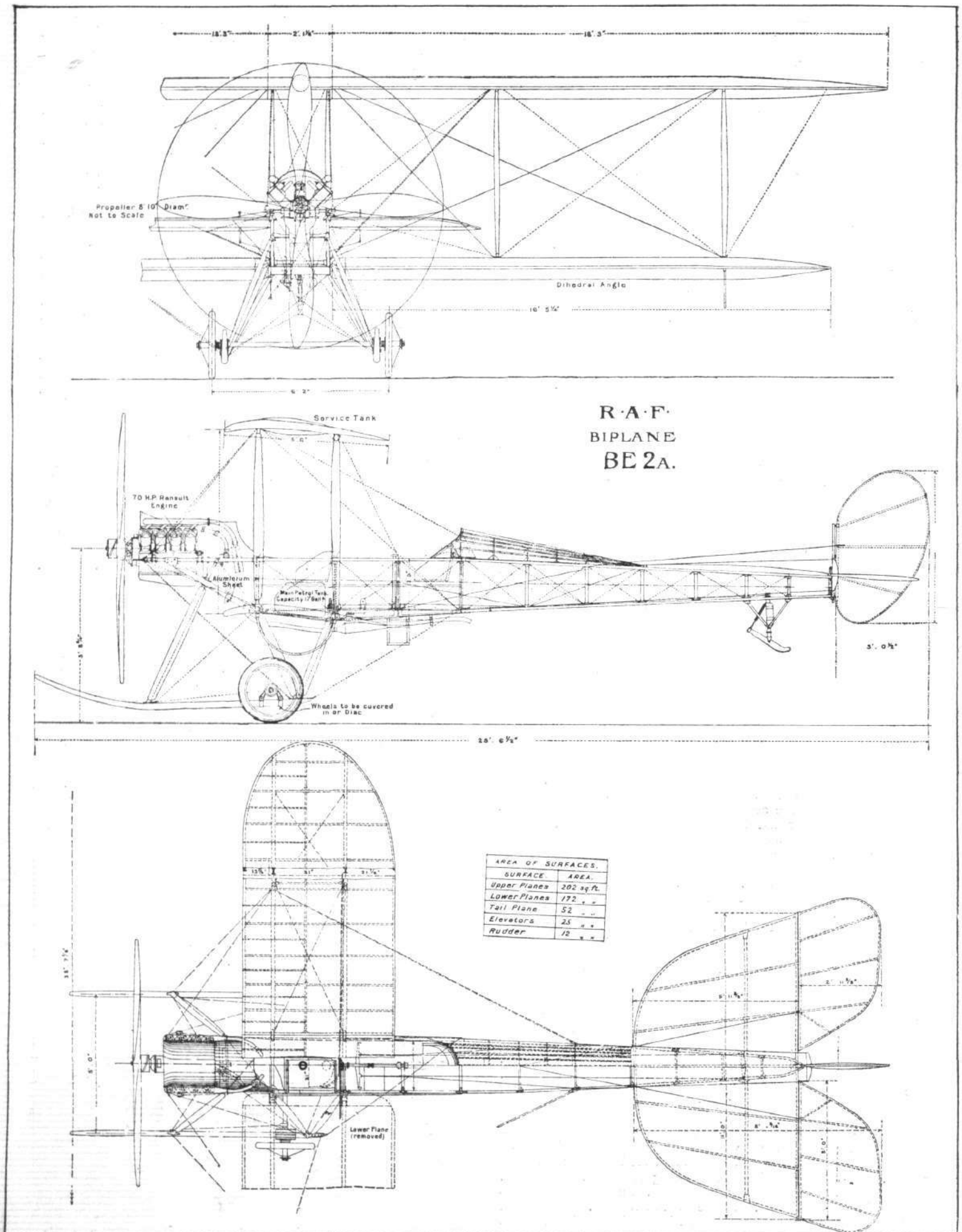
Capt. Fulton took Air-Mechanic Hodgson out for practice on Thursday. Leading Seaman Bateman was also out under Capt. Fulton for instruction. The same officer then took Lieut. Lushington on the same machine, Avro 404, to the practice grounds. Petty Officer Andrews was also out with Capt. Fulton twice, and afterwards made a circuit alone in good style, finishing up with a good landing. Lieut. Hubbard was on Avro 406, and went off in the direction of Lark Hill, returning after a trip of 15 mins. Lieut. Young then went out on Avro 404 for a trip lasting 20 mins. Major Gerrard took up Leading Seaman Prichett for instruction, making no fewer than five trips. The same machine, the Short biplane 401, was also taken out by the following officers: Capt. Risk, Lieut. Allen and Lieut. Atkinson in succession. Lieut. Freeman and Lieut. Pepper were also out on 401. Capt. Risk then took up Leading Seaman Brady and Private Smally, R.M.L.I., in succession. Just before dinner Capt. Darbyshire came over from Farnborough on 206, and after dinner went for a turn round the aerodrome on the same machine, which was afterwards piloted back to Farnborough by Lieut. James in a freshening wind from the west. Major Gerrard was also out for a trip on Short Tractor.

On Saturday Capt. Fulton took Lieut. Lushington out to the practice ground for gallops, Lieut. Shepherd afterwards going for a turn round on the same machine, Avro 406. Capt. Fulton then took Avro 404 with Air-Mechanic Hodgson for instruction, and was up about 20 mins. The wind was rather gusty. Lieut. Hubbard then took the machine, and made a trip lasting about 35 mins. He went off in a south-easterly direction, and returned past the sheds, going off in a south-westerly direction this time without stopping. The Short Tractor 413 was taken for a couple of trips by Major Gerrard, followed by Lieut. Shepherd. The wind was now rather stronger, but Lieut. Freeman also made a good flight of 40 mins. on the Short Biplane 401. Major Higgins came over from Lark Hill aerodrome on machine 203, and after landing for a short while returned on machine to Lark Hill again, going at a fast pace.

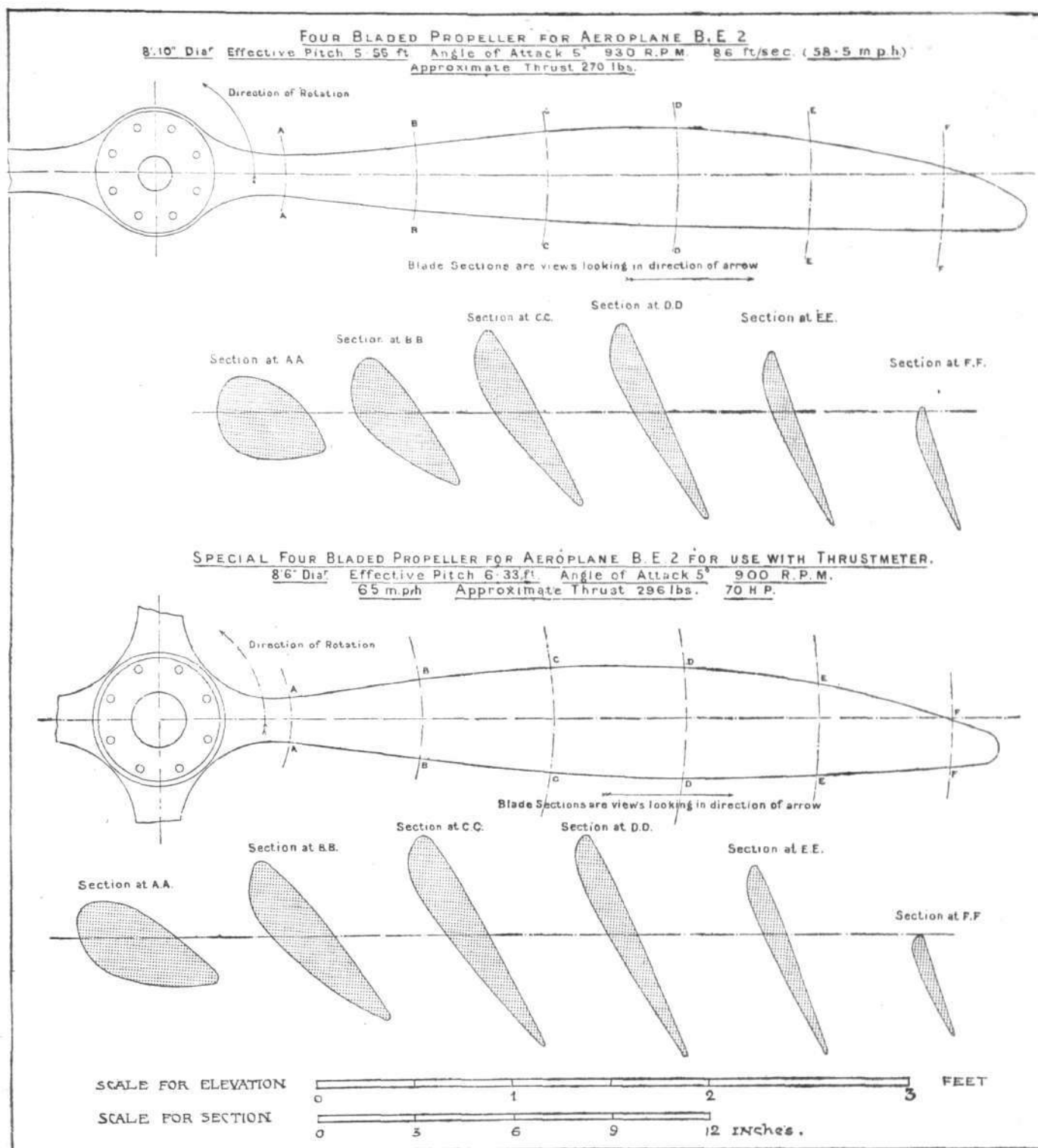
Weather too rough Monday for flying. Strong wind blowing from the west; and next day weather still very bad, strong winds and rain from the west.



M. A. Ponnier, one of the Directors of the Hanriot Co., and a very fine practical flyer.



Elevations and plan of the R.A.F. biplane BE 2a, from the Technical Report of the Advisory Committee for Aeronautics, 1911-12.



Propeller designs from the Technical Report of the Advisory Committee for Aeronautics, 1911-12.

**ROYAL FLYING CORPS.**

THE following appointment was announced in the London Gazette of the 8th inst. :—

Establishments, Royal Flying Corps. Military Wing.—Second Lieut. Charles G. Bell, Special Reserve, is appointed to the Reserve. Dated November 9th, 1912.

Mr. Hamel Fouls Telegraph Wires.

WHILE starting off for an Exhibition flight at Burnley, on Saturday afternoon, on his Blériot machine, Mr. Gustav Hamel had a narrow escape from a serious accident. The field from which he started was not very large, and when rising, the machine was caught

by a gust of wind and carried against the telegraph wires which ran along one side. Mr. Hamel, however, had complete control of his machine, and although the propeller suffered somewhat, remained up for about ten minutes.

Bristol "B.E." Biplanes for Australia.

FOR the Flying Corps which is being established in the Commonwealth the Australian Government have, in conjunction with the British War Office, placed an order with the Bristol Company, for the supply of two tractor biplanes of the B.E. type, a number of which class of machines the Bristol Company are at present constructing for the British War Office.

FOREIGN AVIATION NEWS.

Another M. Farman Military Pilot.

ON one of the oldest M. Farman biplanes belonging to the French Army, Lieut. Briault qualified for his superior *brevet* on the 7th inst. Leaving Mailly Camp he flew to Buc in 1 hr. 20 mins., and then went back to Mailly. After dinner he made another trip to Buc, thus accomplishing over 600 kiloms. in less than half a day.

Six on a Hydro-aeroplane.

ON his hydro-biplane which took part in the recent meeting at Pritzg, Von Gorissen, on the 8th inst., at Frankfort, flew with five passengers for 23 mins. The weight carried was 428 kilogs. The world's record for five passengers is 1h. 6m. 8s., held by Molla.

Bathiat after Height Honours.

ON Sunday, at Mourmelon, Bathiat, on his Sommer monoplane, made an attempt on the height record, but after climbing to 3,000 metres in 42 minutes, and flying for a quarter of an hour at that height, his petrol supply failed, necessitating a descent.

Fine Flight on a Hanriot.

ON one of the new Hanriot monoplanes, with 50-h.p. Rossel - Peugeot motor, Dubreuil made a flight of 3 hrs. 30 mins. at Rheims on Sunday.

New Breguet Military Pilots.

ON Sunday Serjeant Vannin made the first test for his Military *brevet* on a Breguet at Douai. In the previous week Serjeant Petit started off on the triangular cross-country test, but had to land because of the night at Amiens. He was unable to get on for three days owing to the incessant rain, and then returned to La Brazelle to make a fresh start.

Nieuports for Argentina and Italy.

AT Villacoublay on Sunday afternoon Espanet was testing a couple of 100-h.p. Nieuport machines ordered by the Argentine Government. With a load of 350 kilogs. they climbed 500 metres in 5 mins. A similar machine built for the Italian Army, with Gobe in charge, took a load of 370 kilogs. up 1,000 metres in 17 mins.

Good Work with the Rhone.

ON his Sommer monoplane, fitted with Rhone rotary motor, Gilbert, on the 6th inst., flew from Villacoublay to Etampes *via* Tours and Orleans, in four hours. The next day he went on to Issy.

Long Trip on a Caudron.

SOME very fine flying was witnessed at the Caudron aerodrome at Crottoy, on the 6th inst. Lieut. de Bihan made a trip of 200 kiloms., and Lieut. Gerard, Sapper Jacquemart and Deloche also made long flights, while Gaston and Rene Caudron were kept busy taking up passengers.

At the Morane-Saulnier School.

By way of terminating their apprenticeship, Lieuts. Hantz and Garde, on Sunday afternoon, at Villacoublay, each made flights of an hour and a-half. Gilbert was testing a Morane machine fitted with one of the new Rhone rotary motors, and Col. Estienne witnessed some trials with the machine which holds the height record.

350 Kiloms. on a Blériot.

CAPT. SOURDEAU, on Saturday last, went from Etampes to Port Levoy and back, a distance of 350 kiloms., on his Gnome-Blériot.

New Nieuport Military Pilots.

SERGEANTS CANAL AND FAIDIT completed their tests for the French superior *brevets* on Saturday by flying on their Nieuport monoplanes over a course from Villacoublay to Port Levoy and back, a distance of 370 kilometres. Serjeant Hurtard was flying for an hour and a-half, and Serjeant Picquet for an hour.

Seven Deperdussin Pilots in Six Days.

LAST week saw seven certificates gained at the Deperdussin School at Etampes, the new pilots being MM. Guglielminetti, Urizburro, Hickel, Rousseau, Fanet, Terce, and Martinez Rex.

The Pommery Cup.

THE distance from Valenciennes to Biarritz in the course covered by Daucourt in his winning flight for the Pommery Cup has been measured by the Military Authorities, who put it at 852.3 kilometres.

The Anzani 'Jeton d'Or.'

ON Sunday two attempts were made in the Anzani Jeton d'Or Competition organised by M. Anzani in which the aviator making the best time between Paris and Bordeaux, not exceeding ten hours, will be given 25 francs a day up to the end of the year or until his time is bettered. Both started from Issy, Obre on a 40-h.p. Anzani-Caudron monoplane and Bosono on an Anzani-Caudron biplane, and were much troubled by the rain, so that Obre decided to abandon his attempt at Etampes, while Bosono gave up at Orleans, and then flew back to Etampes.

Good Work on Borels.

LIEUT. DE LA MORLAYE, on his Borel monoplane, went from Buc to Chartres on the 6th inst., and returned *via* Orleans on the following day. Lieut. Personne made a flight of an hour's duration, and Sapper Pecquet was flying at an altitude of 2,000 metres. On Sunday, Lieuts. Ragot and Pegat made trials of 1 hour each.

Flight "Man-Birds."—V.

—From the original by Frank M. Williamson.



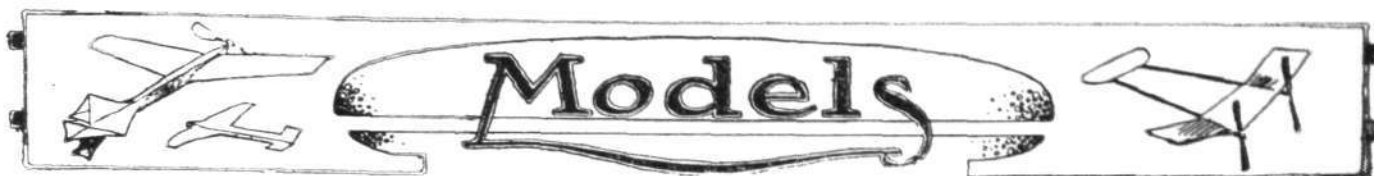
THE CRESTED SCREAMER.

Double Fatality in Germany.

WHILE Lieut. Altrichter was flying with a passenger on a biplane at Halberstadt on the 6th inst., the engine suddenly failed, and the machine dived steeply from a height of 20 metres. Both men were instantly killed.

A Flying Elopement.

THE aeroplane seems to be playing a part in a good many matrimonial affairs over in America nowadays, and we are now told of an elopement by aeroplane. In order to overcome the opposition of the young lady's parents, Arthur Smith is said to have flown over to Fort Wayne, Indiana, for his sweetheart, Miss Aimee Cour, and then taken her on his aeroplane to Hillsdale, 75 miles away, where they were married. On hearing the news the bride's parents wired "Forgiven, but come home by train." We wonder what the next "stunt" will be. There won't be many "records" left to be taken soon.



Edited by V. E. JOHNSON, M.A.

Scientific Model Building.

III. The Principles of Framework.

LET A, B, C, D, represent a quadrilateral or four-sided figure hinged or pinned together at A, B, C, and D. It is obvious that the shape of the figure can be altered either by pressing A and C or B and D together, or by pulling them apart. Even if A, B, C, and D were bolted together, and the nuts screwed up tight, such a framework would be very liable to alter its shape under a sudden blow. In other words, no matter how A, B, C, and D were joined together, it would be, practically speaking, impossible to make the four-sided figure A, B, C, D stiff or rigid by the action of such joints.

Take three pieces of wood and clamp them together at the corners, the form or shape of such a figure is unalterable, for the simple reason that it is impossible to make two different triangles with the same three sides. This is the one great guiding principle in aeroplane as in all bridgework, &c. The quadrilateral or four-sided figure has of itself no rigidity, because innumerable different quadrilaterals can be made with the same four sides. Let us now suppose another rod placed across from D to B, and bolted at D and B to the rest of the framework; our original non-rigid quadrilateral has now become two rigid triangles, ADB and DBC, and has now become unchangeable in shape. Let us study for a moment the action of this single diagonal piece, BD. If we compress A and C together we tend to force B and D apart, and the rod, BD, is subject to a stretching or tension force; if we try to pull A and C apart we tend to force B and D together, i.e., it is subjected to a compressive force—the rod therefore becomes in the one case a tie, in the other a strut. For this reason it is advisable to make use of both the diagonals, AC and BD, when triangulating up,

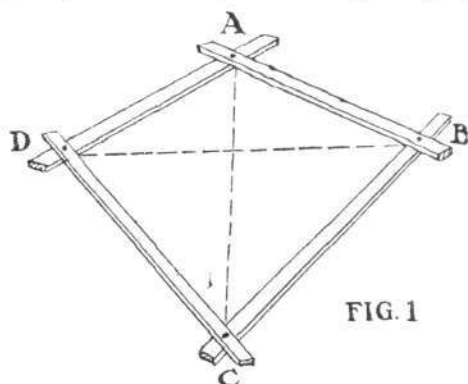


FIG. 1

because when one is a tie the other is a strut and *vice versa*. In aeroplane work where the diagonals, AC and BD, are almost always represented by wires, such a course is an absolute necessity. If the original piece of framework be composed of more than four sides, i.e., be a polygonal figure, the same principle is applied, and we have the following general law—that every such piece of framework should be composed of triangles, and triangles only. The above explains the use of the so-called A frame (see Fig. 2) so much in vogue in the "flying-stick" type of model. In this figure the complete triangulation of the frame should be noted. Such a frame is of great strength in withstanding deformation in its own plane. But this is by no means all or even the chief forces to which the frame is subjected, although these latter are counterbalanced with considerable skill. For instance, by carrying the rubber motors on the outside of the triangular frame and in the same plane, the longitudinal bending moment of such forces is reduced to a minimum and the torque of one motor tending to twist the framework out of its plane in one direction is balanced by the equal and opposite torque of the other rubber motor tending to twist it out of its plane in the opposite direction. The section of the wood shown in Fig. 2 is also (as we have seen) one to combine strength with lightness. Nevertheless it is generally advantageous to have two "kingposts," one on each side of the isosceles triangular frame at about the middle point of its sides, with

two steel wires running from the vertex of the triangle to the corresponding corner of its base, over the top and bottom of the kingpost, thus (by triangulation) stiffening the sides against bending either up or down under the pull of the stretched rubber. Obviously there will be two wires to each side, one above and one below. To prevent deformation of the framework it is evidently an advantage to wind up both propellers at once; there is a very neat device devised by Mr. Twining by which this can be done from the apex of the triangle, the propellers themselves being held stationary; the principle is one which obviously has other advantages.

The method of balancing one torsional force by another, although not perhaps unscientific, is not always good in practice. And a little thought or a few experiments will soon show the reader who may not have hitherto paid any particular attention to this point,

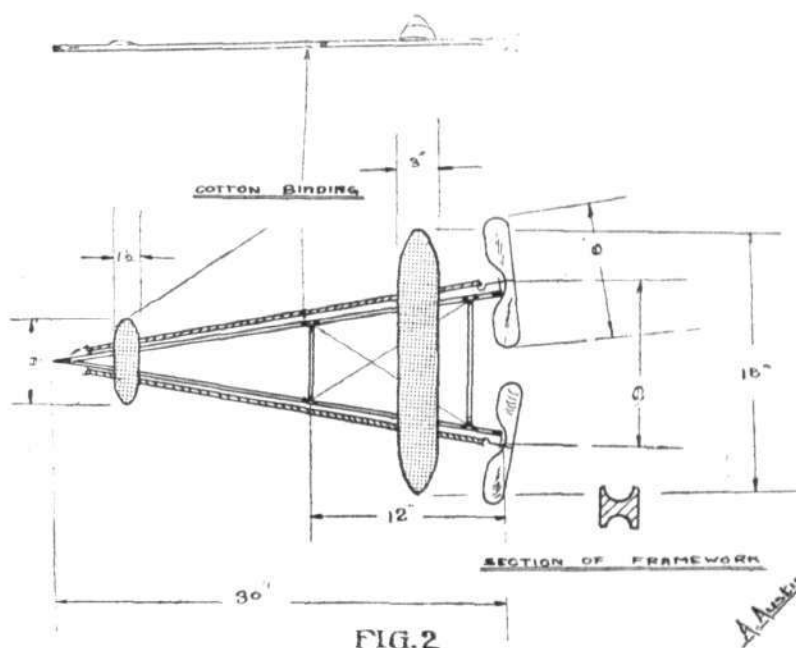


FIG. 2

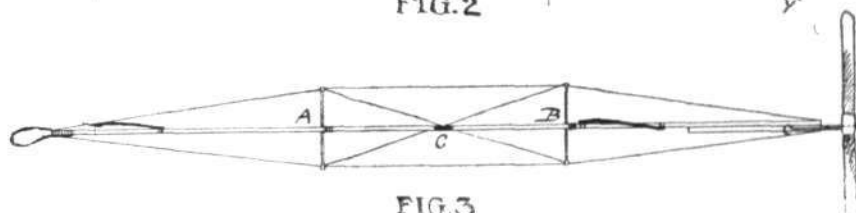


FIG. 3

that it is not difficult or complicated so to stay your A frame by cross wires that even in the case of a very light frame these torsional forces are successfully resisted. The great point is, of course, to do it with as few wires as possible, because such (especially when vibrating) increase resistance as well as weight. In Fig. 3 is shown the central rod of a T frame, A and B are two kingposts. The triangulation (in the vertical plane) should be noted. The student should try examples of other triangulations and note the results. The rod will, in general, also require triangulating in the horizontal plane as well by means of suitable wires and a horizontal kingpost placed at C. The central rod is here shown of the same thickness, or unvarying vertical section throughout its length. A little consideration will, however, show that it should be thickest at about C, and taper towards its ends; this tapering should not be overdone. The same remarks re overcoming the torsional forces of the rubber motors by suitable wiring again apply in this case. In the construction of the fuselage of larger model the question of lattice girder frames is one which must be carefully studied. In connection with this we may refer the reader to an article on Scientific Model Construction by Mr. G. T. Richards (June 4th, 1910, issue).

"Flight" Prizes of Merit.

We have very carefully considered the various and varied entries so far sent in with respect to the above, and although some of them are undoubtedly of decided merit and no little interest, there is not

one which appears to us to have quite reached a standard of sufficient excellence to warrant our recommending it to the Editor as worthy of a Prize and a Certificate of Merit. For instance, a set of photographs of a model or models, no matter how good, is not sufficient in itself to merit any such reward. It would be different if the set had some definite aim in view—the illustrating of some definite theory of wind-pressure, say on the upper and lower surfaces of a cambered plane, of some disputed point in stability, of propeller action, &c.

In general the entries show a want of a definite aim in view. It is not sufficient to merely devise a paper glider, which is successful as such, without stating the reason why, or to send in a selection of the same, merely stating that such a one does so and so and another so and so, *without drawing deductions from the experiments*. Why is A successful and why is B not? What can I conclude from a certain result and what from another? From *every experiment something can be deduced*; unless this deduction be made, of what use making the experiment? Of course, the deduction may not always be correct. Especially is this the case if made as the result of a single experiment. It is, therefore, always better, nay, necessary, to make the same experiment three or four times over and take the mean before making any deductions, as the chance of error is thereby much decreased.

Some of the contributions scarcely came within the scope of the Section. An interesting article on "Discing," for example. Another dealt with a method of making paper gliders non-hygroscopic by means of a certain chemical solution. Now, the very essence of a paper glider is not its *permanence* at all, but the fact that it can be constructed at a moment's notice out of almost anything and used to illustrate some point in aerodynamics. We are also by no means convinced that the stiffening of a paper glider improves its gliding properties; as a matter of fact, it is generally the reverse, and we have a very clear recollection of a lecturer who *starched*, or at any rate stiffened, his paper gliders before the lecture, with the idea of improving them, the result being that they glided like brick-bats.

We are quite sure that there are plenty of our readers who are capable of forwarding something of the right sort, and as soon as it comes along we shall only be too pleased to write across it: recommended for the Flight Prize and Certificate of Merit, and pass it on to the Editor for his final consideration.

We might just add that these prizes and certificates will only be awarded to amateurs and are not open to professional aeromodellists.

KITE AND MODEL AEROPLANE ASSOCIATION. Official Notices.

British Model Records.

Hand-launched ...	{ Distance ...	A. E. Woollard ...	477 yards
	{ Duration ...	A. F. Houlberg ...	89 secs.
Off ground ...	{ Distance ...	G. Rowlands ...	232 yards.
	{ Duration ...	A. F. Houlberg ...	51 secs.
Hydro, off water ...	{ Duration ...	G. P. Bragg-Smith ...	25 secs.
Single-tractor screw, hand-launched ...	{ Distance ...	H. R. Weston ...	84 yards.
	{ Duration ...	F. W. Jannaway ...	22 secs.

Lecture.—On Friday, November 8th, the Association held a patriotic meeting at Caxton Hall, Westminster. Col. F. C. Trollope presided, and the lecture was delivered by Col. S. F. Cody on "What the Nation should do to stand First in Aviation." He gave a most interesting and instructive lecture on the needs of the nation. During the interval a fighting appeal was made on behalf of the war kite squadron, by the Rev. Everard Digby, who stated that it was imperative that the nation should be as up-to-date as France, who already had recognised the importance of having a motor kite squadron. Among those present were Viscount Esher, chairman of the County of London Territorial Association, Major-Gen. Ruck, Major-Gen. Arbutnot, Col. H. S. Mason, Col. Smyth, Col. Stewart, Honble. Mrs. Leveson-Gower, Dr. Barton, A.F.Ae.S., Messrs. H. MacGregor, C. Grey, T. Hamilton Fox, R. M. Balston, E. Trollope, &c., most of whom have promised donations towards the squadron.

War Kite Squadron.—Donations towards this squadron are earnestly requested, and any donations will be gratefully accepted on behalf of the squadron by any of the Council, it being hoped that someone will come forward and subscribe for a complete section (which the Council will be pleased to name after the donor), such as Kite Section, Wireless and Telephone Section, or Gun Section.

HYDRO-AEROPLANES AT MONACO.

A FULL programme has now been issued by the Sporting Club of Monaco giving details of the events for hydro-aeroplanes which are to be held at Monaco during the first fortnight in April next year. The machines will be on exhibition on the water on April 3rd, and from the 4th to the 11th the eliminating trials will be carried out. The final events will be a race on April 12th over a course of 80 kiloms. from Monaco to San Remo, Monte Carlo, Beaulieu and Monaco, and on April 14th a 500-kilom. event over a 10-kilom. course in Monaco Bay. The eliminating tests include (1) starting up from the water, the engine being started without touching the propeller and with the sole aid of the passenger, if one is carried, and making a flight of about a hundred metres between

Replies in Brief.

W. W. FITZGERALD.—Scale drawings of the Etrich monoplane were given in a back number of FLIGHT.

H. E. HERVEY.—Were your drawings washed in light and dark brown; these bear no name or signature?

S. CAMM.—Am much afraid it is quite impossible to make the motor you mention successful; the only thing you can try is to heat the CO₂ in its passage from the reservoir to the motor. For an hydro-aeroplane, where extra power is needed, we regard it as quite useless, especially in so small a size.

L. F. HUTCHESON.—The suggestion was not entirely humorous. Some years ago we propelled models by means of small rockets. The idea might be used to launch hydro-aeroplanes of somewhat large weight in proportion to their supporting surfaces. Certainly, continue your experiments, and later on we shall be pleased, if possible, to make use of your results.

R. L. B. STEELE.—In reply to your first query, there is considerable difference of opinion; personally we consider the lifting tail preferable, at the same time we have also seen the other type exhibit excellent stability. In reply to your second query, the A or T frame, loaded elevator, twin-propeller type of some 3 ozs. to 4 ozs. weight, appears capable of flying, or at any rate of remaining up in the air until the power runs out, in practically any kind of wind.

C. J. TEMPERLEY.—In reply to your first query, try a tractor-gear motor (two cogwheels of same number of teeth) and Centrale Propeller—biplane with straight wings—staggered. In reply to your second we regret we are not at liberty to give any such recipe, you must obtain it commercially. Try to start one—we do not agree with your friend. We propose dealing with joints, and later on the subject of propellers will be dealt with as well.

J. REFOY.—If, as you state, you wish to sell your model, the best thing for you to do is to advertise it for sale. Personally we cannot do anything in the matter.

W. T. CHANDLER.—In reply to query 2: *Aspect ratio* is $\frac{\text{span}}{\text{chord}}$.

Span is the distance from tip to tip of the main supporting surface measured transversely (across) the line of flight. *Chord* is the distance between the entering (or leading) edge of the main supporting surface and the trailing edge of the same; also defined as the fore and aft dimension of the main planes measured in a straight line between the leading and trailing edges.

No. 1 is dealt with in December 16th, 1911 and January 20th, 1912 issues. In last named for $a = 450$ read 45.

Model Section Aero Show.—Full details of this section it is hoped will be published in next issue, after the Council have met the Royal Aero Club Committee this Thursday. All clubs and members will have rules, &c., posted on at earliest moment.

27, Victory Road, Wimbledon.

W. H. AKEHURST, Hon. Sec.

MODEL CLUB DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (15, HIGHGATE AVENUE, N.).
NOVEMBER 16TH. Flying, Finchley, as usual. Illuminated flights at dusk.

Hendon Model Aero Club (8, MONTAGU ROAD, W. HENDON).
NOVEMBER 16TH. Monthly duration contest.

Leytonstone and Districts Aero Club (64, LEYSPRING ROAD).
NOVEMBER 16TH. Flying, Wanstead Flats (opposite brickfields).
November 17th. Near Bushwood Avenue, 9.30.

Reigate, Redhill and District (8, BRIGHTON ROAD).
NOVEMBER 16TH. Tractor trials (Earlswood). November 17th. Flying at "Wiggie."

Scottish Ae.S. ("ROCHELLE," LINESIDE AVENUE, RUTHERGLEN).
NOVEMBER 16TH. Monthly competition, Paisley Racecourse. November 23rd.

Hydro-aero competition, Alexandra Park. November 30th. Tractor competition sweepstake at Maxwell Park. December 7th. R.o.g. competition, Paisley Racecourse.

two lines of buoys; (2) altitude test, including rising to 500 metres and alighting on the water in less than thirty minutes; (3) *vol plané* test, rising to 100 metres and coming down with motor stopped; (4) hoisting test, during which the machine would be hoisted by a derrick; (5) towing test, during which the machine must be towed 100 metres by a rowing boat or motor boat; and (6) navigation test, in which the machine must cover on the water one round of the motor boat course 6.25 kiloms. During all the events two persons must be carried, or if the pilot elects to go alone he must take 70 kilogs. of ballast, the equivalent to the weight of a passenger. There will be five prizes ranging from 3,000 francs to 25,000 francs. Entries close on February 28th.

CORRESPONDENCE.

* The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which have appeared in **FLIGHT**, would much facilitate ready reference by quoting the number of each letter.

Balloon Records.

[1668] Your correspondent (1657) asks for information with regard to the greatest recorded height ever attained by a manned balloon, viz., that made by Messrs. Coxwell and Glaisher on September 5th, 1862. In "Aerial Navigation of To-day," the author (Mr. C. C. Turner) states that the balloon ascended from Wolverhampton on the date above mentioned, and that although the last observation was made at a height of 29,000 ft. (shortly before Glaisher lost consciousness), it was established beyond doubt that the balloon reached an elevation of (about) 37,000 ft., or fully 7 miles. Coxwell apparently did not become unconscious, but lost the power of his hands, and was only able to open the valve-cord with his teeth to prevent further ascent.

Amesbury.

(Miss) I. S. J. WINDLEY.

[Letters containing this information have also been received from G. V. Upward, R. W. Leadbeater, C. S. Crickmer, "R.P.C.," G. Palmer, and H. Oliver.—ED.]

[1669] In reply to C. A. K. Cox (letter 1657), the following is a paragraph from "How to Fly," by Richard Ferris:—

"In recent years the greatest height reached by a balloon was attained by the Italian aeronauts, Piacenze and Mina, in the "Albatross," on August 9th, 1909. They went up from Turin to the altitude of 30,350 ft. The world's height record rests with Prof. Berson and Suring, of Berlin, who on July 31st, 1901, reached 35,500 ft. The record of Glaisher and Coxwell in their ascension on September 5th, 1862, has been rejected as not authentic, for several discrepancies in their observations, and on the ground that their instruments were not of the highest reliability. As they carried no oxygen, and reported that for a time they were both unconscious, it is estimated that the highest point they could have reached under the conditions was less than 31,000 ft."

Ludlow.

DENNIS FOSTER.

Gyroscopic Action in Accidents.

[1670] The last issue of *Aeronautics* (American) states that the several accounts of the Quimby-Willard accident printed in that and other magazines, were written by "experienced aviators who were on the ground, and ought to know," and infers that my opinion should have no weight as against this so-called "expert testimony." It is true that I did not witness the accident, but I have carefully studied the numerous descriptions of it, and have culled from them a number of important points relating to the action of the machine at the time. While no two of these accounts fully agree, some offering as many as three solutions, and some of them saying that "probably the real cause will never be known," they generally agree on the following features:—

1. "Suddenly something happened."
2. "The machine seemed to hesitate and tremble for an instant."
3. "The fuselage of the machine was thrown upward and to the right."
4. "The body of Willard was pitched upward and outward," a distance variously given at from 25 ft. to 35 ft., "as though shot from a catapult."
5. That "the machine twisted to the left as it fell."
6. That "after Willard had been thrown out, Miss Quimby succeeded in momentarily righting the machine."
7. That "the next downward twist dislodged and threw Miss Quimby."
8. That "the machine this time headed straight for the earth."
9. That during all this time the motor was whirling at its highest speed.

Now, we will take up these points in the order given above, and show how each and every one of them assist in proving the correctness of my theory.

1. The danger point in gyroscopic force is only reached when the deviating force is sudden, and the upward toss of the front end of the machine was so slight and so quick that it could not have possibly been noticed from the earth one thousand feet below.
2. The "hesitating," "trembling," or "shuddering" that is always noticed and remarked just before the machine plunges downward is simply a phase of gyroscopic action. It is produced by the translational motion due to the sudden shifting of the centre of mass in the rotating body, and causes three distinct forces to combat each other for supremacy.
3. If, as is shown in the action of the machine, the disturbing

force was in an upward direction, the gyroscopic twist would have forced the nose of the machine to the left and downward and caused the fuselage to move to the right and upward. The position of the rudder, or even the contrary action of the rudder and elevator combined, could have no appreciable effect on the direction of the machine when once in the clutches of this force. This was clearly demonstrated in the recent Paul Peck accident.

4. The tremendous force with which Willard was thrown out of the machine fully disproves Mr. Ovington's claim that the upsetting was due to a fouled rudder cable. The passenger seat occupied by Willard was but a few feet to the rear of the lateral axis of the machine, and had the downward dip been caused any force applied to the extreme rear the machine would have turned on its lateral axis. I believe that all competent engineers will agree with me when I state under such conditions the angular velocity at the point occupied by Willard could not have been great enough to have dislodged him, to say nothing of hurling him the distance stated. On the other hand, if the dip was caused by gyroscopic action in the motor, the turning moment would have been about a lateral axis situated in the centre of mass of the motor. This would have provided a leverage three or four times greater than the first condition, and amply sufficient to have thrown Willard as described.

5. Had Mr. Ovington scoffed less at my theory and read more carefully what I have had to say about gyroscopic action, written, by the way, some time before Mr. Ovington became an "expert aviator," he would have been spared his time and expense in procuring affidavits to prove that "the machine twisted to the left as it fell," for he would have known that I positively stated that under such condition the machine *always turns to the left as it falls!*

6. The natural gyrating action of the machine when under the influence of this force, especially after being relieved of the dampening effect of Willard's weight, would be to continue its spiralling motion and in its first drop of perhaps one hundred feet would appear to right itself.

7. As the nose of the machine was again twisted downward in its natural spiralling course, the angular velocity of the fuselage now being greater, by having been relieved of Willard's weight, Miss Quimby was thrown out.

8. From this point the machine, being weighted only at its nose, and robbed of its gyrational axis, should have shot straight to the earth.

9. Little or no mention was given the fact that the motor was running, yet, had Miss Quimby been fully aware of this terrific force lurking in her revolving motor and had she instantly cut out her spark, she could undoubtedly have succeeded in righting the machine and would be alive to-day to tell of it.

Does it not seem absurd that anyone should lay so much stress on having found a fouled control-cable in a wrecked aeroplane that had fallen one thousand feet? There were, no doubt, many other parts either fouled or broken by the impact with the water, why did not someone select others of these on which to lay the blame? My guess is that it is all attributable to general ignorance of the principles of gyroscopic action and the immense power that it is capable of exerting under certain conditions.

When I discovered this danger, now nearly six years ago, I stood absolutely alone, as far as I can learn, but I am happy to say that during the past two years a number of scientists and engineers throughout the world have found the same thing, and have declared themselves in positive terms. I know that the first scientist who claimed that the earth was round, against the general belief that it was flat, barely escaped being crucified, and that a scant hundred years ago the world threatened to burn at the stake others of our scientific innovators, but I did not for a moment anticipate that in this enlightened age it would require the sacrifice of so many human lives before the truth would be recognised.

THOMAS PRESTON BROOKE.

Chicago, U.S.A., Oct. 18th.

[Other Correspondence held over.—ED.]



5,000 francs from French President.

WITH a view to stimulating subscriptions for the French National Fund, the President of the Republic, M. Fallieres, has sent a subscription of 5,000 francs.

A New Prize for Aviettes.

WITH a view to encouraging inventors of humanly propelled flying apparatus to persevere with their work, M. Robert Peugeot has supplemented his prize of £400 for the first to cover 10 metres, by one of £80, for the first aviette which shall succeed in covering five metres, under the same conditions as for the larger prize.

Mishap with "Adjutant Vincenot."

AT the commencement of a voyage by "Adjutant Vincenot," from Toul, on November 5th, a sudden gust of wind tore the guide-rope out of the hands of the soldiers forming the holding-down party. Three of them were, however, carried aloft, and while two dropped when about 10 metres up, one held on, and was carried up 300 metres. The pilots eventually brought the airship sufficiently near the earth for him to drop off, although he broke an arm in falling. When the airship eventually landed, apparently too much strain was placed on the forward guide-rope, and as a result some of the stays attaching the car to the envelope gave way. The envelope then commenced to go out of shape, and at last came into contact with one of the propellers, smashing it, and becoming so badly torn that the airship became a complete wreck. Fortunately, however, no one was injured except the soldiers who fell from the mooring-ropes.

Colonel Cody and the Cow.

FORTUNE failed to smile on Colonel Cody when he was sued at Farnham County Court last week for £20, the value of a cow, killed by his monoplane on Cove Common last July. For the defence it was argued that the cow became frightened and ran into the aeroplane, but the judge held that a person who used a dangerous machine, such as an aeroplane was in the present state of the science of aviation, did so at his own risk and peril, and was liable for the damage which resulted, quite apart from any proof of negligence. Without finding Colonel Cody guilty of any negligence, he came to the conclusion that the plaintiff was entitled to succeed, and awarded him £18 damages.

British Hanriots for Abroad.

WHILE paying a visit recently to the works of Messrs. Hewlett and Blondeau we espied a single-seater Hanriot ready for delivery, as well as another single-seater and a two-seater well on the way to completion, and were somewhat surprised to hear that these machines were going to France for sale to the French and Russian Governments. It certainly seems strange that machines of English material and workmanship should be sent out of Great Britain for the defence of other countries at a time when England is so much in need of fast and good aeroplanes both for the Army and Navy. The machines are of the same type as those which performed so well in the Military Trials, and which have been so successful in France.

A Very Artistic Catalogue.

ALTHOUGH it is only yet in its infancy, the aviation industry has produced several highly artistic catalogues, but the palm must be given to that issued during the Paris Salon by the Farman Brothers, in the interests of the Henry and Maurice Farman machines. A copy has reached us from the Aircraft Co., Ltd., St. Stephen's House, Westminster, which firm, as our readers know, are now constructing those successful machines from British materials with British labour. The book has a very clever foreword by Georges Prade, which is illustrated by a large number of amusing thumbnail sketches by Fabiano. The second half of the book embraces a description of the Farman works and aerodromes and the firm's methods of teaching, together with full particulars of their machines, all profusely illustrated by excellent photographs. At the end there is a significant little table which states that 700 pilots, including 300 officers, have qualified on Farman machines, while over 100 officers have obtained superior certificates on them. It was a "stock" Maurice Farman machine, it will be remembered, which won third place in the recent British Army Trials.

"For the Highway and the Skyway"

Is the title of a little brochure just published by Messrs. C. C. Wakefield and Sons, 27, Cannon Street, London, E.C., which gives a long list of successes of "Castrol" during the present year in events on land and water, and in the air, the last-mentioned including the Aerial Derby and the Michelin Cup No. 1. The book is illustrated by a number of views of motor car, boat, and cycle events, and there are half-a-dozen portraits of leading flyers. Anyone of our readers can secure a copy by mentioning FLIGHT.

A Book for Draughtsmen.

THOSE draughtsmen who are fortunate enough to secure a copy of the little book of conversion tables, just issued by the United Motor Industries, Ltd., 45 and 46, Poland Street, W., in the interest of D. W. F. Ball bearings will value it very much. Those who have to do with the conversion of metric dimensions into English know that although the tables given in most pocket books are excellent in their way, they fall a good deal short of the ideal. It is there where this little book comes to their aid. It gives tables of fractions of an inch into decimals of an inch; inches to millimetres, progressing by 64ths up to 12 inches; and millimetres into inches with decimal and common fractions.

Further Accession to the G.A.C.

WE learn that Mr. Claude Schofield has joined the General Aviation Contractors, Ltd., 30, Regent Street, W., as a director and secretary. We feel sure that this accession to the Board of this well-known firm, which now handles so many of the necessities of the flight industry in this country, will lead to a further expansion of its activities.

Cellon Successes.

DURING the season which is just closing Cellon-doped machines have been very successful. In addition to the Cody biplane which won the two chief prizes in the Military Aeroplane Competition, other machines doped with Cellon secured prizes to the value of about £1,000. Other successes with machines so doped were: Mr. T. O. M. Sopwith's Blériot, which was awarded the *Daily Mail* Gold Cup and £250 in the Aerial Derby; Mr. F. P. Raynham's Burgess-Wright biplane, which won the Shell Trophy and £75; Mr. H. G. Hawker's Sopwith-Wright biplane, which won the Michelin Cup No. 1; and Mr. Raynham's Avro biplane, which was second, as well as Col. S. F. Cody's biplane, which won the Michelin Cup No. 2.

PUBLICATIONS RECEIVED.

Magneto and Electric Ignition. By W. Hibbert, A.M.I.E.E. London: Whittaker and Co. Price 2s. net.

The Brighton-Shoreham Aerodrome. Brighton-Shoreham Aerodrome, Ltd., Shoreham, Sussex.

Luftschrauben-untersuchungen, 1911-1912. By Dr. Ing. F. Bendemann. Munich and Berlin: R. Oldenbourg. Price Mk. 2.50.

Technical Report of the Advisory Committee for Aeronautics for the Year 1911-1912. Teddington: Advisory Committee for Aeronautics, National Physical Laboratory. London: Wyman and Sons. Price 11s.

Catalogues.

The Breguet Aeroplanes. Breguet Aeroplanes, Ltd., 5, Hythe Road, Willesden, N.W.

Veritable histoire de l'Aéroplane. By Georges Prade. Edited by H. and M. Farman. Farman Frères, Billancourt, Seine, France.

IMPORTS AND EXPORTS, 1911-12.

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910):—

	Imports.		Exports.		Re-Exportation.	
	1911.	1912.	1911.	1912.	1911.	1912.
January ...	1,196	619	1,088	2,412	Nil	Nil
February ...	3,129	3,110	1,786	36	Nil	Nil
March ...	11,327	640	1,027	950	357	600
April ...	2,110	4,820	807	72	4,343	50
May ...	1,707	7,494	2,471	1,350	1,972	154
June ...	3,225	7,928	2,432	419	1,682	300
July ...	9,822	13,794	2,256	5,376	643	967
August ...	2,873	8,559	2,153	1,342	265	2,040
September ...	1,839	6,575	1,183	2,885	—	1,626
October ...	4,727	6,836	701	3,128	400	695
10 months	41,955	60,375	15,904	17,970	9,662	6,432

Aeronautical Patents Published.

Applied for in 1911.

Published November 14th, 1912.

23,277. J. WULFFING. Smith and Aerial Transit, Ltd. Airships.
27,771. E. W. WAKEFIELD. Aeroplane floats.
29,319. L. DANGY. Parachutes.

Applied for in 1912.

Published November 14th, 1912.

5,459. J. C. HANSEN-ELLEHAMMER AND N. W. AASEN. Aerial machines.
20,927. R. ESNAULT-PELTERIE. Aeroplanes.

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